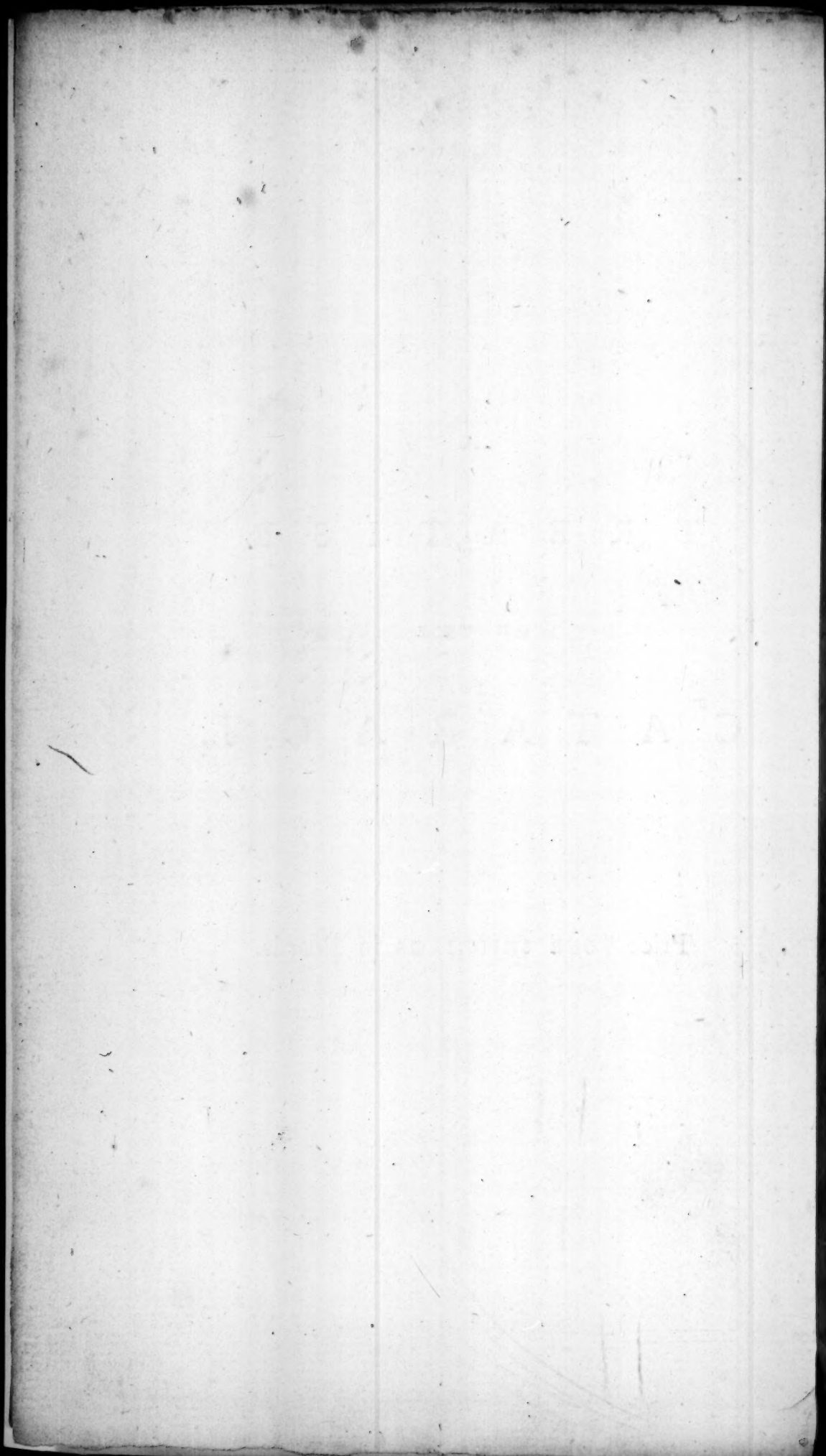


A
T R E A T I S E
ON THE
C A T A R A C T.

Price FOUR SHILLINGS in Boards.



A
T R E A T I S E
ON THE
C A T A R A C T;
WITH
C A S E S

TO PROVE THE NECESSITY OF DIVIDING THE
TRANSPARENT CORNEA, AND THE CAPSULE
OF THE CRYSTALLINE HUMOUR, DIFFE-
RENTLY, IN THE DIFFERENT
SPECIES OF THIS DISEASE;

By M. DE WENZEL, JUN.

Baron of the Holy Roman Empire,
Physician of the Faculty of Nancy, and
Regent Doctor of the Faculty of Medicine, in the University
of Paris.

Translated from the French,

WITH MANY ADDITIONAL REMARKS,

By JAMES WARE, SURGEON.

LONDON:
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THE STATE

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January 1, 1891

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OF THE

COMMISSIONERS

OF THE LAND OFFICE

IN RESPONSE TO A RESOLUTION

PASSED BY THE SENATE

APRIL 1, 1891

ALBANY:

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1891

THE
TRANSLATOR'S
PREFACE.

THE late Baron de Wenzel acquired so much celebrity, and his reputation is so well established in this Country, as well as upon the Continent, that it is needless to pass any encomium here upon his extraordinary skill in performing the operation, which is the subject of the following Treatise. The Translator has, for many years past, devoted a considerable part of his attention to the study of this interesting branch of
a *surgery:*

surgery:—he has carefully perused every publication he could procure relative to it, that has appeared in this, and the neighbouring kingdoms: and, in addition to the advantages which these have afforded him, he has, in the course of his practice, reduced to the test of experience most of the hints of improvement, that have been suggested by professional writers. But, after all, he feels it incumbent upon him to acknowledge, that he has derived the most useful and important information, from the opportunities with which he was favoured of seeing the Baron operate, and from the remarks occasionally made by the Baron, on the different parts of his process.

In the present Treatise these remarks,

marks, with many others of equal importance in this branch of surgery, are related with a candour which does honour to their Author. By presenting them therefore to the English Reader in his native language, the Translator flatters himself that he shall contribute to render the Baron's experience more extensively useful, and the Operation of Extraction more generally approved.

But as it is perhaps impossible for any two persons so exactly to agree in opinion, with regard to the various minutiae of this operation, as not to have any difference in sentiment concerning them, the Translator has taken the liberty to point out those parts in which he could not perfectly coincide with the Author;

he has added the reasons for his dissent, at the bottom of the page in which they occur. In a few instances he has also thought it advisable to render the Author's expressions a little more explicit than they appear to him to be in the original work.

These additions he hopes will prove not unacceptable.

New Bridge Street,
April 18, 1791.

THE

T H E

A U T H O R ' s

P R E F A C E.

TH A T branch of Surgery which relates to diseases of the Eyes, and the proper mode of treating them, is of the greatest importance; whether it be considered with regard to the address and dexterity, or the accurate and extensive knowledge, which are requisite to the successful practice of it. This remark particularly applies to the Operation for the cure of the Cataract, which has at all times been considered as extremely difficult, and has engaged the attention of a great number of authors.

thors. There are, indeed, few subjects in the art of Surgery, upon which more has been written. Various methods of performing this Operation have prevailed at different times; and concerning each of these, professional men have been very much divided in opinion. Even in the present day, although Surgeons in general have relinquished the practice of depressing the Cataract, on account of the ill-succes and the inconveniences that too commonly attend it, yet a man of great eminence in the profession, Percival Pott, still prefers this Operation to that of Extraction. And among those who adopt the latter Operation, the most proper Mode of performing it has never yet been determined, nor the best shape of
of

of the instruments adapted to this purpose. Some, to divide the cornea, make use of an instrument shaped like a spade on cards; others, of one whose blade is curved and rounded on one side; and there are some who even still employ specula, to fix the eye, notwithstanding the mischievous effects which, as I have particularly shewn in the following Treatise, these always produce.

Why do not Surgeons adopt one uniform plan in performing Operations? Why do they not agree among themselves, which Mode is the most simple and easy; and which the most likely to procure success? Why, from the mere love of innovation, are new instruments continually introduced, which fall

short of the boasted advantages attributed to them by their inventors? These questions are peculiarly applicable to the various Operations recommended for the Cure of the Cataract. If the inventors of new instruments had been less eager in recommending them, the greater number of such persons would have learnt, by experience, that they did not, in fact, answer the expectations which had been formed concerning them. When new instruments are really good, it is enough for the inventor to avail himself of the use of them, in those operations which he himself performs. He has no occasion to announce them to the world. Their peculiar advantages being known to his patients, will speedily be communicated to the faculty;
and

and a sort of popular eclat, in its consequences beneficial to society, will, sooner or later, prove a sure means of establishing their pre-eminence. Upon this plan, there can be no danger of involving others in error. If the instruments are afterwards found to have less merit than they were at first supposed to possess, the illusion created by the first ideas of the inventor will insensibly vanish, and the public sustain no injury.

This is the plan which my father has pursued. The instruments he employs in extracting the Cataract, and the method to which he has constantly adhered in performing the Operation, he invented
above

above five and thirty years ago*. A long and happy experience have fully ascertained their utility. And though, during the whole of this period, he has not published any thing on the subject, yet his Instruments, and his mode of Operating, have been adopted by most Oculists; and many who have written on the Cataract, have taken the liberty to describe them, without doing him the justice to which he is entitled. This, in some may have proceeded from an ignorance of my father's claim, but in others, it can only be attributed to a desire of appropriating to themselves the merit of his invention. A few who have described his mode of Operat-

* This Treatise was published at Paris, in the year 1786.

ing,

ing, have indeed quoted him, but the greater number have passed * him by in total silence.

Brought up under my father's instructions, and guided by his advice, I have studied with particular attention, the treatment of Disorders of the Eyes, and for more than twelve years I have been much engaged in the Operation of extracting the Cataract. I now consider it no less as a duty, than as a tribute of gratitude due to my father, to publish an account of his success. And I am the more strongly determined to this measure, from a conviction of the advantages which must result to the public, when his practice becomes better understood, and

* See Richter's *Observation de la Cataracte*, p. 20. 1770.

more

more accurately defined. With this view, I have observed the greatest precision, in describing the Instruments he employs, as well as the Method in which he uses them. I have pointed out the precautions proper to be observed, before, during, and after the operation. I have explained the different methods to be pursued, according as the Cataract is more or less complicated with other Disorders of the Eye. This part of my Treatise, I venture to affirm, is entirely new. I have also combated many prejudices, which have too commonly been adopted, on points relative to this disorder.

It being my sole view, in the present publication, to give an account of the success of my Father's
Plan

Plan of Operating; to guide those who are disposed to follow it; and to correct some errors, which have been propagated by those who have taken upon them to describe it, without fully understanding it; to these objects I have particularly directed my attention. I have not entered into a minute detail of the causes of the Cataract, nor of its cure by internal remedies; because I believe the former are very little known, and the latter, when the disease has made any progress, totally impracticable. I have not dwelt upon the history of the Operation, nor upon the different Methods that have been proposed for performing it, from the time of Celsus, down to the present day. Nor, in short, have I added one

word, which did not appear indispensably requisite to render our mode of operating clear and intelligible.

If I had thought it necessary, I might, like a modern Surgeon*, have presented to the public a very large collection of cases. But as this could have answered no other purpose, than to swell the size of my book; I have described only those which were remarkable, and calculated to support the assertions I have advanced. These cases have been collected from a very considerable number; as will readily be admitted by the judicious and candid practitioner, who knows how

† M. G. Pellier fils, Chirurgien de Montpellier. Recueil de Mem. et d'Observat. sur les Maladies de l'Œil, Montpellier, 1783, in 8° de 524 pages.

rarely such cases occur, in comparison with those of the common Cataract. They are derived either from my father's experience, or from my own, and may be considered as the result of forty years practice. It is my earnest hope that this account of them may prove useful to the Public.

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REMARKS on the Ophthalmy, Pforophthalmy, and Purulent Eye. With Methods of Cure, considerably different from those commonly used; and Cases annexed, in Proof of their Utility: Also the Case of a Gutta Serena cured by Electricity.

By JAMES WARE, Surgeon.

The Second Edition, with Additions.

A
T R E A T I S E
O N T H E
C A T A R A C T.

S E C T. I.

The Definition of a Cataract.

O F all chirurgical operations, none have been attended with more remarkable success, than that which restores sight to the blind, by taking away the opaque body, which intercepts the light in its passage to the immediate organ of vision. This malady, of which we find no mention in the writings of Hippocrates, is known by the name of Cataract. It shews itself as a speck or spot in the pupil of
B the

the eye, occupying sometimes the whole, and sometimes only a part of this aperture. It is most commonly of a grey, or whitish, colour; but sometimes of a deep white; and may in all cases be easily distinguished from the naturally dark appearance of the pupil. In the commencement of the disorder, it occasions a weakness and imperfection of the sight; and it terminates, sooner or later, in the almost total extinction of this sense. During its progress, the persons who are affected by it perceive objects more distinctly in a moderate, than in a strong light; the reason of which is, that the pupil being more dilated in a weak light, still admits some rays through the yet transparent circumference of the chrystalline. This disease, which seldom attacks persons before the age of forty, comes on, nevertheless, sometimes at a much earlier period. In this latter case, the chrystalline humour is generally milky; and both the anterior and posterior portions of the capsule are also, at the same time opaque.

The

The operation, therefore, is not so certain a cure for the cataract in children, as in persons of a more advanced age. Children, again, some of whom are born with cataracts, are in general, so unmanageable, that the operation becomes almost impracticable. For these reasons, it is advisable to postpone it, until they arrive at the age of reason and reflection, and feel by experience the necessity of submitting to it. In such subjects no danger is to be apprehended from delay. Their cataracts are not apt to form adhesions to the neighbouring parts: whereas, those of old persons often form such adhesions; and these render the operation not only more difficult, but much less certain of success.

S E C T. II.

The Opinion of the Antients, with regard to the Seat of the Cataract.

THE antients, supposing that the eye could have no perception of objects without the chrySTALLINE humour, which they considered as the essential and immediate organ of sight *, generally believed that the cataract was produced by a pellicle, formed before the chrySTALLINE, in the posterior chamber of the aqueous humour; and modern writers, supported by their authority, especially that of Galen †, have eagerly

* Celsus, lib. vii. cap. 7, p. 432. in 12°. Amstelod. 1687. Sub his gutta humoris est ovi albo similis; a qua videndi facultas proficiscitur; *κρυσταλλοειδής* a Græcis nominatur.

Galen de Ufu Partium, lib. x. cap. i. p. 529. edit. Charterii, Lutetiæ, 1679, in fol. tom. 4.

† See Oribasius Synops. lib. viii. cap. 47.

Ambrose Paré, lib. xviii. cap. 19. p. 456. Lyon. 1623.

Mery Mem. de l'Acad. des Sciences, 1707, p. 497. in 4°.

Woolhoufius in Diario erudit. mensis Novemb. 1720, p. 568.

Hovius

eagerly defended the same opinion, until the beginning of the present century. About this time, some opaque chrySTALLINES, having been depressed with the needle, rose again, and, passing through the pupil into the anterior chamber*, were thence extracted through an incision made for that purpose in the cornea †. These facts, supported as they are by repeated dissections, and by the operation of extracting the opaque chrySTALLINE, which has been practised in many thousand instances without any injury to the sight, have now fully set aside the erroneous opinion of the antients; and have satisfactorily proved that the cataract is solely owing to an opacity, either of the chrySTALLINE humour ‡, or its capsule; and that

Hovius de Circul. Humorum in Ocul. Motu, 1740.

De la Hyre, junior, Mem. de l'Acad. des Scienc. 1707, p. 553.

* Brisseau appears to have been the first who gave the name of chambers to those parts which contain the aqueous humour.

† S. Ives, Malad. des Yeux, Paris, 1767, p. 237.— Mem. de l'Acad. des Sciences, anno 1708, p. 242.

‡ Lasnier Recherches sur la Chirurgie, p. 404.

that the loss of sight, in this disorder, is occasioned by the opaque humour intercepting the rays of light in their progress to the immediate organ of vision *.

Rolfincius in Dissert. Norimb. 1656, lib. i. cap. 13, p. 179.

Gassendi Oper. Physic, tom. 2. p. 371.

Rohault Traët. Physic, tom. i. p. 416.

Marriotte nouvelles Decouvertes sur la Vuë, Paris, 1668.

Brisseau Traité de la Cataracte et du Glaucoma, Tournay, 1706.

Ant. Maitre Jean Malad. dex Yeux, in 12°. p. 98, 1740.

* I have frequently seen the membrane of the aqueous humour (*a*) rendered opaque after an hypopion. This accident will be described in another place. It would tend to confuse the description of disorders of the eye, if the name of membranous cataract was given to such an opacity.

(*a*) The translator has taken pains to ascertain the existence of this membrane of the aqueous humour, by dissecting a very considerable number of eyes of different animals; but he has, hitherto, been unable to discover it in any of them.

SECT.

S E C T. III.

On the Causes of the Cataract.

THE causes of opacity in the chry-
 talline humour are so various and un-
 certain, that I shall not dwell upon them,
 any more than upon the remedies that
 have been proposed for the prevention and
 removal of this disorder. I shall only re-
 mark, that persons who are much exposed
 to strong fires, as blacksmiths, locksmiths,
 glassmen, and those who are engaged in
 similar employments, seem to be more
 subject to it than others. In general, it
 first shews itself, by the appearance of
 threads, flies, cobwebs, black specks, bars,
 and other fantastic figures, dancing before
 the eyes. These are seldom accompanied
 with any pain, except it be an occasional
 slight sensation of weight in the ball of the
 eye, and about the forehead. When the
 cataract is produced by an internal cause,
 both eyes are almost always affected, the

one after the other, in the same way. A blow, or any other external act of violence, may excite the disorder in one eye only; but in this last case, the operation seldom restores sight to the patient, because other parts of the eye are, in general, injured by the accident, as well as the chrystalline humour*.

* The translator is somewhat surprized that the author, in his list of the internal symptoms of the cataract, should omit to mention the appearance of a settled mist covering objects, and confusing those that are minute. In the instances of this disorder that have fallen within the translator's observation, and especially in those which have been formed without any assignable external cause, this mist has almost always been perceived by the patient, before any opacity has been visible in the pupil. All the other symptoms, which the Baron describes, appear to the translator to be more likely to proceed from extreme sensibility in the optic nerve, than from an incipient opacity in the chrystalline humour.

SECT.

S E C T. IV.

On the Inefficacy of the Remedies usually employed in this Disorder.

THE principal external remedies that have been employed in the cure of the Cataract are, bleeding, cupping, scari-fying, setons, issues, blisters, and fumiga-tions; and the principal internal reme-dies are, aperients, incisives, emetics, ca-thartics, sudorifics, cephalics, and sternu-tatories. Preparations of eyebright, mil-lepedes, wild poppy, henbane *, and hem-lock †, have also been much commended as specifics for this disorder. There would be no end of enumerating the various re-medies that have been proposed and ad-

* Sauvage, Nosolog. Method. p. 724, Amsterdam, 1768.

† Anton. Stoerk libell. quo demonstratur cicutam, &c. Vindobon. 1760. Libell. cum Supplem. 1771. See an extract from it in the Journal de Medicine, 1760, June, p. 503.—Journal de Medicine, tom. 24. p. 366. 1766, par M. Chemin.

ministered

ministered under the same idea. Their number and variety are sufficient proofs of their inefficacy. It is nevertheless true, that many eminent physicians, antient and modern*, have thought that incipient cataracts might be dissipated by internal remedies; and some have flattered themselves with the idea of having succeeded, not only in the commencement of the disease, but when the cataract was further advanced, and even when perfectly formed†. Scultetus‡ asserts, that he had checked its progress, by applying to the eye the gall of a pike, mixed with sugar; and Spigelius, as we are informed by the same author, boasted of having successfully used, for this purpose, the oil of the eel

* Celsus. lib. vii. cap. 7. N° 13. p. 431, 432. Amsterd. 1687.—Hilden. Epistol. 69.

Fabr. ab Aquapend. Oper. Chir. cap. de Suffus. Venetiis, 1619. p. 23.

Boerhaave de Morb. Ocul. p. 119, 120. Paris, 1748.

Lemoine, Thèse aux Ecoles de Medicine, Paris, 1728.

Stoll. Ratio Medendi, tom. 3. 8vo. Vindob.

† Hovius, Tract. de Circul. Humor. in Ocul. Motu, p. 122, 1740.

‡ Armam. Chirurg. Declar. p. 127. an. 1672. Amstel.

pout (*mustela fluvialis*). These assertions, however, and others of a similar nature, have been severely censured by men whose opinion is of great authority in the medical profession *.

It has been said, that cataracts have been cured, in venereal patients, whilst they were under a course of mercurial medicines; but it is highly probable, that the complaints, so cured, were totally different from an opacity of the chrystalline humour. It requires a more accurate acquaintance with disorders of the eye, than is generally supposed, to distinguish an incipient cataract from those extravasations of lymph, which occasionally are formed between the lamina of the cornea. These disorders, however, may readily be known from each other, by examining the eye side-ways; in which position, an opacity in the cornea will evidently appear to be situated anterior to the aperture of the pupil, and an opacity in the chrystalline as evidently posterior to it. The reflection of the light

* Heister. Instit. Chir. Amstel. in 4to. p. 564.

from

from the cornea tends to mislead, in these cases, on taking a front view of the eye, and especially if the examination be superficial, and the patients complain of seeing mists in the air, or objects darting through it. Now it appears to me evident, that the disorder above mentioned, which gave way to the use of mercury, was nothing more than an extravasation of lymph in the substance of the cornea. And, as there is no well-authenticated case, which proves the success of any remedies in dissipating the cataract; and as, on the contrary, I have, in a great number of instances, had occasion to observe their total inefficacy, I think myself authorized in asserting, that internal remedies, either of the mercurial, or of any other kind, are inadequate to the cure of this disorder; and, equally so, whether the opacity be in the chrySTALLINE, or in the capsule *, whether incipient, or advanced. Such applications tend only to feed a delusive hope, and vainly to torment

* Tenon, Thèse aux Ecoles de Chirurgie de Paris, ann. 1757.

those

those patients, who at last must have recourse to the operation, as the only sure means by which their sight can be restored * †.

SECT.

* Antoine Maitre Jean, *Malad. des Yeux*, article de la Cataracte, Paris 1740. "Des autorités assez graves m'avoient fait croire autrefois que les cataractes dependantes d'un vice vénérien, pouvoient ceder à l'usage du mercure; mais, des observations multipliées, que j'ai eu lieu de faire depuis, m'ont absolument de trompé, et m'ont convaincu qu'elles étoient aussi rebelles à toutes especes de remèdes que les autres."

† Although the translator assents to the truth of the observation here made, on the uncertainty of all known medicines to dissipate an opacity, either in the chrystalline, or its capsule, or even to prevent the progress of such opacity when once begun, yet many cases have occurred, which prove that the powers of nature are often sufficient to accomplish these purposes. The opacities, in particular, which are produced by external violence, he has repeatedly seen dissipated, when no other parts of the eye have been hurt, in a short space of time; and, in general, in cases of this description, the chrystalline humour has been dissolved; which has been proved by the benefit the patient has afterwards derived from adopting the use of deeply convex glasses. In some of these cases, though the chrystalline has been dissolved, the greater part of the capsule has remained opaque, and the light has been transmitted to the retina only through a small aperture which has become transparent

S E C T. V.

*On the different Modes of operating
for the Cataract.*

TWO modes of operating, totally different from each other, have been practised, at different times, for the cure of the cataract; one by means of depression, which is called *couching*; the other by extraction. The former, and most ancient of these, which is supposed to have

parent in its center. Instances, again, are not wanting, in which cataracts, which were formed without any violence, have been suddenly dissipated in consequence of an accidental blow on the eye. For these reasons, the translator is willing to hope that means may hereafter be discovered, by which an opaque chrystalline may be rendered transparent without the performance of any operation whatsoever. The remedies which have appeared to him more effectual than others, in these cases, have been the application to the eye itself of one or two drops of æther, once or twice in the course of the day; and the occasional rubbing of the eye, over the lid, with the point of the finger, first moistened with a weak volatile or mercurial liniment.

been

been invented by Celsus, consists in piercing the coats of the eye, on the side next the small angle of the eyelids, and at the distance of about one-sixth of an inch from the cornea, with a strait needle*; by means of which instrument, the cataract is to be displaced and depressed. Needles that are round †, and flat, blunt, and cutting, have at different times been employed in this operation; and by some, those that are shaped like the tongue of a carp have been considered as most convenient. The chrySTALLINE, by this mode of operating, is depressed below the pupil, and deposited in the inferior part of the vitreous humour. I cannot assent to the opinion of those practitioners, who think that it is here dissolved ‡; since what has been advanced in support of this opinion, has not been confirmed by experience. In the oppor-

* Celsus de Medicina, lib. vii. cap. 7. N^o 14. de Suffus. p. 434. Amsterd. 1687.

† Heister. Instit. Chir. Amsterd. 1750. p. 569.

‡ Henckel, Dissert. Medic. Francofurti ad Viadrum, 1728.

tunities I have had of dissecting, and examining the eyes of persons after death, some of whom had, long before, been operated upon according to this method of depression, I have always seen the chrySTALLINE entire, and in its natural shape.

The needles employed in depressing the cataract have been much varied, as I before observed, by different operators. The round needle appears to me, to be the most improper; because it enters the eye with less facility than others, and, bruising the membranes through which it passes, is more apt to induce inflammation.

Avicenna * recommended the use of two needles; one sharp, to pierce through the coats of the eye, and the other blunt, to depress the cataract.

I cannot conceive it possible to extract a cataract in the way Albucasis† proposed, by introducing into the eye a hollow needle, in the shape of a canula,

* Lib. iii. Tract. 4. cap. 19.

† Appendix, varior. Instrum. Scultel. tab. 14. p. 63. fig. 1. 1672.

and sucking strongly at its extremity. It is equally unaccountable, that Rocho Mathioli, surgeon to Charles Ferdinand, archduke of Austria, should advise the introduction of a gold wire, inclosed in a canula, into the eye, to seize the cataract, (which he in common with his cotemporaries believed to be membranous) and, by gently moving the instrument, to extract the cataract on the point of the wire. This operation is described in Scultetus *.

Bernard Albinus proposed to extract the cataract, which he also believed to be membranous, by means of an instrument resembling a small forceps †.

Freytagius advised to extract the cataract with a needle bent like a hook. He insisted, that the cataract was in all cases membranous, and that it scarcely ever was occasioned by an opacity of the chrystalline humour. The remark I have made above concerning this supposed membrane,

* Armament. Chir. p. 79. Amsterd. 1672.

† Heister, Instit. Chirurg. p. 580. tom. I. in 4to. Amsterd. 1750.

applies equally to Freytagius*, and to Heinr. Wilhelmus Geisler†, who also maintained that the cataract was produced by an opaque membrane formed in the aqueous humour.

Petit recommended, in the operation of couching, carefully to avoid wounding the anterior portion of the chrySTALLINE capsule, and to divide only the lower part of its posterior portion. He was confident, that by this method, the vitreous humour filling up the space that was previously occupied by the chrySTALLINE, the rays of light would be refracted nearly as much as if the eye was in its natural state, and the necessity of using glasses afterwards would, in a great degree, be obviated‡.

I think it unnecessary to enter further into an explanation of the different modes of depressing the cataract, since this operation is at present almost universally ex-

* Thèse soutenue à Strasbourg, en 1721.

† Dissertatio inauguralis medica de curandis præcipuis oculorum affectibus, &c. Erfordiæ, 1723, p. 8. § x.

‡ Vide Platner, Instit. Chirur. in 8°. anno 1783. p. 696.

ploded.

ploded. Exclusive of many other inconveniences attending it, it is, in fact, in many cases impracticable. Not to speak of the opaque capsule, (which is entirely out of its reach,) if the chrySTALLINE be soft, and, as it frequently happens, almost in a fluid state, its depression cannot be accomplished by means of the needle. This impossibility of depressing it has given rise to the assertion, as absurd as it is erroneous, that such a cataract is unripe*, and not of a proper consistence to admit of an operation. It would, however, be in vain to wait till it gains solidity, since such a cataract continually becomes softer. It is therefore impossible that by this mode the patient should ever be cured. In vain do the ad-

* Percival Pott, *Remarques sur la Cataracte*, p. 498, traduit de l'Anglois par M. Seinoine, 1779 (a).

(a) From the reference above made to Mr. Pott's remarks on the cataract, it appears, that the Baron understood Mr. Pott to entertain an opinion of the cataract's increasing gradually in consistence, and thereby becoming more and more fitted for the operation. In justice to Mr. Pott, the translator feels it incumbent on him to observe, that this gentleman took great pains to correct so great an error. And in proof of this, he refers the reader to Mr. Pott's *Remarks on the Cataract*, p. 5.

Cusson *Remarques sur la Cataracte*, p. 8. in 4°. Montpellier, 1779.

vocates for depression exaggerate the accidents that follow the operation of extraction. It is proved by observation and experience, that they are much less considerable than those which attend depression.

SECT.

S E C T. VI.

*An Examination of the Objections
against Extraction.*

THE accidents which are charged upon the operation of extraction may be reduced to the eight following: 1st, the staphyloma;—2dly, pain;—3dly, the discharge of the vitreous humour;—4thly, the irregularity of the pupil;—5thly, the deformity of the cicatrix;—6thly, the closure of the pupil;—7thly, the secondary cataract;—and 8thly, the section of the iris.

1st, With regard to the staphyloma, I shall make it appear, that the mode in which we divide the cornea, most commonly prevents this accident, by hindering the iris from coming forwards. But if such an accident should at any time happen, notwithstanding this care to prevent it, I hope to prove in the sequel, that it may be reduced by merely rubbing the eye-lids;

and that it does not occasion those ill effects which some authors have dreaded *.

2dly, The unavoidable pain that attends the operation of extraction is to be moderated, as in other operations, by general remedies. It is, however, notwithstanding the assertion of a late author †, less severe than that which is produced by depression.

3dly, It is difficult for any considerable portion of the vitreous humour to escape, when the operation is performed according to the mode I shall presently describe. If such an accident happens, in cases where the cataract is simple, where the vitreous humour is free from disease, and where the posterior part of the capsule does not adhere to the body of the chrySTALLINE, it must be attributed to unskilfulness in the operator, and must not be considered as a necessary consequence of the operation itself. When the posterior part of the capsule comes away, together with the

* Guntius, Dissert. de Staphylomate, Lipsiæ, 1748.

† Remarques sur la Cataracte, par Cusson, Montpellier, 1779, p. 31, in 4°.

cataract,

cataract, the effusion of a small portion of the vitreous humour may sometimes unavoidably take place; but this effusion, if small, does not necessarily destroy the sight, as will be evident from many of the cases related in this dissertation. In some patients, even a considerable effusion has not prevented the success of the operation; though in others, it must be owned, this accident has much diminished the clear perception of objects.

4thly, An irregularity in the figure of the pupil, is an accident which rarely occurs, unless the eye has been much fatigued during the operation; and even when this has happened, I have not always found that the irregularity has injured the sight; on the contrary, it is generally accompanied with an enlargement of the aperture of the pupil; which enlargement, if the cicatrix be slowly formed in the cornea, and extends far over this coat, will prove beneficial, rather than injurious; because it will admit the entrance of a more considerable number of rays of light

into the eye, than could have been admitted if the pupil was small.

5thly, With regard to the cicatrix of the cornea, if the incision be made with one instrument, and one stroke; if it be near the margin of the sclerotica, and large enough to allow the opaque chrystalline to pass through it without violence; in this case, the cicatrix will scarcely be visible, and will not at all obstruct the rays of light in their passage to the retina.

6thly, A total closure of the pupil is a misfortune which rarely happens after the operation of extraction, but much more frequently after that of couching*.

7thly, A secondary cataract, by which I mean an opacity of the posterior capsule of the chrystalline lens †, takes place also
much

* The operation which I propose in cases of a closure of the pupil, is described at the end of this dissertation.

† The Baron, in this and many other parts of his treatise, mentions particularly the posterior capsule of the chrystalline humour, *la capsule postérieure du chrystallin*. But, notwithstanding there is unquestionably a considerable

much oftener after the operation of depressing the cataract, than after that of extracting it; and, in the former of these cases, the method I shall propose for its cure is much more difficult to perform than in the latter. But, whether the opacity of the capsule be occasioned by one or the other of these operations, the needle is inadequate to the purpose of removing it, and effecting a cure; because,

considerable difference between the anterior and posterior portions of the capsule, in point of strength, the former being much firmer than the latter, the translator believes it has never yet been proved that these are distinct one from the other. When such an opaque substance as is here described is perceived in the pupil, after the operation either of extraction or depression, this opacity has appeared to him to be much oftener situated in the anterior than in the posterior portion of the capsule; and the former of these he believes to be alone capable of deriving relief from any operation. Sensible, however, that it is very difficult to distinguish between the opacity of the anterior and that of the posterior part of the same capsule, after the chrySTALLINE has been removed, he has here, and in many other parts of the present treatise, taken the liberty to translate the French words, *capsule postérieure du chrySTALLIN*, solely by the words, capsule of the chrySTALLINE.

though

though it may be sufficient to puncture this membrane, yet, when punctured, the sides of the capsule can in no way be removed by the needle from their first position, and of course will still intercept the rays of light. It is not impossible that they may again unite. There remains, therefore, no other remedy but the extraction of the opaque capsule, or of the portions into which it has been divided. For this purpose, an incision must be made through the cornea, and a small forceps introduced, with which the opaque portions may be taken away. This method, if the capsule has formed no adhesions*, presents a flattering prospect of success; but it is a much more hazardous operation after a depression of the cataract than after its extraction. In the operation of

* If the opaque capsule adheres to the iris, and an attempt to extract it be persisted in, there is danger of separating the iris from its connection at the outer margin, and inducing blindness from this cause. A few instances, however, will be mentioned in the sequel, which shew that blindness is not always the consequence of such an accident.

extraction,

extraction, for instance, the vitreous humour, and the cellulæ formed by its enveloping membrane *, remain unhurt; but, on the contrary, in that of depression, it is indispensibly necessary to break through this membrane, in order to provide a place in which to deposit the depressed chrystalline; and, in consequence of the derangement of the vitreous humour produced by this dangerous operation, it is highly probable that during the extraction of a secondary cataract, an abundant discharge of this humour will take place. The following cases afford so many proofs of the truth of this remark,

CASE I.

Miss Deene, a lady of Ireland, having a cataract in each eye, put herself under the care of an oculist passing through

* Riolan. Anthrop. lib. iv. p. 173, appears to be the first anatomist who accurately described the cellules of the vitreous humour.

Dublin,

Dublin, the place of her residence, who operated in the old way of couching. When he had depressed the cataracts, he withdrew his needle, and applied the usual dressings. After some days had elapsed, he examined her eyes; but she could not see at all, the chrySTALLINES having resumed their former situation. As the lady had suffered great pain under the operation, she would upon no account allow it to be repeated by the same oculist. She therefore determined to go to Paris, and to put herself under the care of my father; who performed the following operation, in the year 1769, in presence of M. Pibrac. He began by removing the anterior part of the capsules of both chrySTALLINES, with the small forceps represented in fig. XI. These were become opaque in consequence of the former operations, and white lines were distinctly perceived to cross them, occasioned most probably by the point of the needle; which having pierced, and perhaps torn them, had altered their texture, although the sides of the wounds were afterwards

terwards re-united. The anterior portions of the capsules were scarcely removed, when the vitreous humour began to escape; on which account it became necessary, as quickly as possible, to extract the cataracts, which had sunk to the bottom of the eye. For this purpose an instrument shaped like a hook (see fig. X.) was introduced under the cornea, and with it the cataracts were seized and drawn out. It was afterwards necessary again to introduce the forceps into both eyes, to take away some large fragments of the posterior part of the capsule, which, now becoming visible, appeared to be as opaque as the anterior. This part of the operation required great dexterity, and could not be accomplished without the escape of an additional portion of the vitreous humour. Notwithstanding all these impediments, the young lady was perfectly cured; and from this time distinguished objects much better than could have been expected previous to the operation. She neither suffered from pain, inflammation, nor a staphyloma, and
was

was soon able to read, with the help of proper glasses. The pupils, indeed, were irregular in shape, and larger than they usually are; but their enlargement in this, as in most cases of a similar kind, was rather beneficial than hurtful, because it permitted a proportionably greater number of luminous rays to enter the eye.

C A S E II.

M. Percival, in Thames-street, London, had been twice couched by a surgeon of eminence, in the space of three years; and each time the cataract rose again, and resumed its former situation. Upon this, despairing of a cure from a similar mode of treatment, and having suffered greatly from the operations already performed, he, in the year 1770, consulted my father, who was at that time in London. Upon examination, the opaque chrySTALLINE was still found to be in its natural situation. The pupil was become irregular, and vertically oblong;

oblong; and it was evident, that the anterior as well as posterior portion of the capsule had been lacerated in the different attempts to depress the cataract. The vitreous humour also was considerably injured, and its cellulæ so much deranged, that no sooner had my father completed the incision through the cornea, than a part of this humour, in consistence like the white of an egg, immediately escaped. The cataract, now losing the support which it had before received from the vitreous humour, fell to the bottom of the eye. It became necessary, therefore, to seize it with a small hook, and thus extract it. This was not accomplished without difficulty, and the effusion of another portion of the vitreous humour. It was then expedient, by means of a small forceps, to take away some opaque portions of the posterior capsule; which process was very painful, and occasioned the loss of an additional quantity of the vitreous humour. In order to prevent a still further loss of it, the opera-

tion was no sooner finished, than the eye was instantly covered, and the dressings were applied, without allowing the patient the usual satisfaction of trying whether he could perceive the objects about him. The treatment was simple; no accident occurred, nor did any pain or inflammation ensue *. When the eye was afterwards uncovered, the patient at first saw very little; but the sight sensibly increased from day to day; and after some time he perceived all objects pretty distinctly, the eye being of the same size and fulness as it was before the operation.

In the sequel of this work I shall have occasion to relate many similar cases, in which the recovery of sight was not prevented by the effusion even of a large quantity of the vitreous humour. All the difficulties, which attended the operation in the case above related, were occasioned by the two successive depressions which

* I have remarked, that when a part of the vitreous humour is discharged during the operation, the patient seldom suffers much pain.

M. Percival had undergone; and there is reason to believe that none of these would have occurred, if the operation of extraction had been at first performed.

8thly, The last accident I mentioned, as chargeable on the operation of extraction, was a wound of the iris. This is not likely to happen, if the operation be performed in the manner I propose to recommend; since if, at any time, in making the section of the cornea according to this method, a portion of the iris becomes entangled by the edge of the knife, it may always be disengaged by gently rubbing the fore-finger of the hand that is at liberty, on that part of the cornea which lies before it.

S E C T. VII.

*On the Accidents produced by
Couching.*

SUCH are the objections that have been urged against the operation by extraction. But those against couching are infinitely greater, and the effects of it much more to be dreaded. This is too well confirmed by the incurable disorders to which the latter operation often gives rise.

1st, The pain of couching is not only severe during the operation, but it likewise torments the patient with apprehensions, too well founded, of the dreadful effects it may produce afterwards.

2dly, The vomiting, which frequently comes on at the distance of some hours after the operation *, is apt to produce a collection of matter in the eye. This is particularly to be apprehended, if any of the ciliary nerves are wounded, which ac-

* Heister. Instit. Chir. pars I. sect. 2. cap. 55, in 4°. Amstelod. 1750.

cident is not unusual in couching; and it is frequently occasioned by the puncture of the retina only, which is unavoidable in this operation *.

3dly, The pain produced by the puncture of the retina and the ciliary nerves, is often followed by a suppuration of the eye, or by the formation of a secondary cataract.

4thly, Those persons who have undergone the operation of couching, sometimes feel constant and violent pains in the eye as long as they live. These pains are probably occasioned by the injury which the retina sustains, in consequence of its pressure between the choroides and the depressed chrySTALLINE. I have had an opportunity of dissecting and examining the eyes of two women, after their decease, who suffered unceasing pain from the time of the operation; and, in both these cases, the depressed chrySTALLINE was deposited on the retina, in the way I have here mentioned.

5thly, In introducing the couching needle, the blood vessels, both of the choroides

* Warner, Description of the Human Eye, &c. in 8°. p. 107. Lond. 1775.

and retina, are liable to be wounded; and the extravasated blood, in consequence of it, not only confuses the sight of the operator, but unless speedily absorbed, is very apt to produce a suppuration of the whole eye.

6thly, The soft and milky cataract cannot be depressed by the needle; nor can the needle be employed in such a case with any prospect of success. This I take upon me to assert, notwithstanding the opinion of a celebrated author *, that the milky cataract, when placed in the anterior chamber, and mixed with the aqueous humour, or when depressed to the bottom of the eye, will, in either case, gradually dissolve and disappear, so as to leave no trace of its existence behind † ‡.

7thly,

* Percival Pott, Remarques sur la Cataracte traduites, p. 509, 1779.

† Palucci, Remarques sur la Cataracte, p. 121, in 12°. 1752.

‡ Notwithstanding the opinion of the Baron is here, and, in many other parts of his treatise, very decidedly given against the dissolution of the depressed chrySTALLINE,
and

7thly, After the chryſtalline humour has been depreſſed in the beſt manner poſſible, it is liable to riſe again. Many have found it neceſſary repeatedly to have re-
 courſe

and even of the ſmall portions of this humour that are ſometimes left in the eye after the operation of extrao-
 tion, the tranſlator has met with many caſes which have
 led him to form a contrary opinion. He does not take
 upon him to declare that the depreſſed chryſtalline will
 always diſſolve, ſince he has frequently ſeen that it will
 not ; but he has no ſcruple in aſſerting that it ſometimes
 has diſſolved, and that under the management of dif-
 ferent perſons. He has alſo to add, that an opacity in
 the chryſtalline has occaſionally diſappeared, in caſes
 where no operation of any kind has been performed ;
 and in proof of this latter remark, he refers the reader
 to a paper on this ſubject, which he delivered to the
 London Medical Society about twelve months ago.
 This paper will be publiſhed in the third volume of the
 Tranſactions of the Society, and is now in the preſs.
 In addition to the caſes there related, he begs leave to
 obſerve, that he has ſince ſeen the anterior portion of
 a capſule, in the caſe of a cataract of many months
 continuance, largely punctured by an inſtrument intro-
 duced through the cornea for this purpoſe, in order to
 bring the aqueous humour into contact with the opaque
 chryſtalline ; and in this caſe, at the end of ſome weeks,
 the cataract removed out of its capſule, and came forward
 into the anterior chamber, in which it floated a conſi-
 derable time, gradually decreaſing in ſize, until at

course to the operation *, even at the distance of some years after the time when it was first performed. Cuffon † asserts, that he has never known more than one instance of this kind ; but as he did not apply himself particularly to this branch of surgery, it is not extraordinary that he should consider such a circumstance as

length it totally disappeared. During the time that the opaque chrystalline coated in the anterior chamber, the eye was constantly in a state of irritation ; in consequence of which the patient was repeatedly requested to allow the opaque body to be extracted ; but he always objected to submit to it. The pupil remained large and clear, after the cataract disappeared, but the irritation, which its pressure on the iris kept up, continued so long, that it produced a true gutta serena, which totally destroyed vision. Some months after this, a cataract was completely formed in the opposite eye ; which being extracted in the usual manner, the sight was thereby restored.

* Maitre Jean, *Maladies des Yeux*, article de la Cataracte.

S. Yves, *Maladies des Yeux*, de la Cataracte.

Joseph Warner, *Description of the Human Eye*, &c. in 8°. p. 87.

† *Remarques sur la Cataracte*, par M. P. Cuffon, *Medecin. de Montpellier*, à Montpellier, 1779, in 4°. p. 41.

scarcely

scarcely possible. The opaque capsule cannot, I think, be mistaken for a true cataract, since, upon an attentive examination, the true cataract may always be distinguished by the appearance of its external rim, and by the slight motion which, under such circumstances, it is occasionally observed to undergo; whereas, on the contrary, when the capsule is opaque, the opacity rarely covers the whole pupil, and never admits the smallest change of situation. In such a case, also, the opacity appears more deeply situated in the eye, than when the chrySTALLINE humour is the seat of it*.

8thly, The ciliary processes which surround the chrySTALLINE are liable to be

* The author, by the description he here gives of an opacity in the capsule, must certainly mean an opacity in its posterior portion; but, from the observations the translator has made in similar cases, he is disposed to believe, as he before remarked, that its anterior portion is much oftener the seat of the opacity. And if this be the case, the whiteness, instead of appearing deeper in the eye than when the chrySTALLINE itself is opaque, will necessarily appear more prominent.

wounded by the different movements of the needle, which are necessary to be made, in order to complete the operation ; and this must unavoidably increase the pain the patient undergoes.

The short comparison here drawn between the operation of extraction and that of depression will, I think, be sufficient to demonstrate the superior advantages of the former, notwithstanding the contrary opinion of Pott, Callisen, Cusson, and others.

S E C T. VIII.

*The History of the Operation of
Extraction.*

AS soon as it was fully proved that the true cataract was an opacity of the chrySTALLINE humour,—that the loss or deprivation of sight would not necessarily be occasioned by the removal of this humour,—that the cornea may be divided without danger,—and that, if the aqueous humour be discharged, it will quickly be regenerated *,
the

* The aqueous humour is regenerated with so much facility, that frequently, within three or four seconds of time, after the incision of the cornea has been completed, this tunic, which was flattened by the effusion of the humour, will be found to have resumed its natural convexity. I have sometimes seen it reproduced, even whilst my eye was engaged in observing it. This humour is not found to possess the same degree of transparency at all ages. In youth, it is more limpid than in advanced age. In the fœtus, and also in children newly born, it is, according to the remark of Zinn, p. 146.
Description

the mode of cure by extracting the cataract out of the eye, must naturally, I think, present itself to the mind.

When Daviel first introduced this operation*, the instruments he employed were much

Descriptio Anatom. Oculi, &c. and of M. Sabbatier *Traité d'Anatomie*, p. 546, vol. i. &c. thick and reddish. In persons of a middle age it is very transparent, and slightly viscous. In some it possesses a considerable degree of saltness, which my tongue has often experienced when I have been employed in extracting the cataract. Though it may be frozen, as anatomists have proved by experiments, it is of a spirituous and volatile nature. These qualities it is necessary that it should possess, in order to favour the alternate contraction and dilatation of the pupil, whose motions would be much embarrassed, if the iris floated in a fluid which had more consistence. Anatomists are much divided in opinion with regard to the organs that secrete this humour. That opinion appears to me the most probable, which attributes this function to the terminations of the arteries of the iris. The vessels, which were said to be formed for the particular purpose of secreting and absorbing this fluid, and which were described by Nuck and Hovius, have never been perceived since their time, even by the best anatomists.

* Freytag was the first operator who made an attempt to extract the cataract, about the close of the last century. After him, Lotterius, of Turin, performed this operation. Daviel first communicated this method to the public. And the ingenuity and industry

much too numerous; but I shall not here dwell on their description, since a full account of them may be seen in the Memoirs of the Academy of Surgery at Paris *.

La Faye, a celebrated surgeon of the same city, conceiving that the operation was rendered not only tedious and difficult, but often unsuccessful, by the multiplicity of instruments which Daviel employed, contrived a knife, with which he proposed to make the section of the cornea at one stroke. Some authors † have fancied a resemblance between this instrument recommended by La Faye, and that employed by my father, which I shall presently describe. But such a notion could only arise from an imperfect description of my father's knife, and not from an inspection of the instrument itself ‡. If La

industry of Wenzel has, at length, brought this mode of operating to a state of perfection never before attained. Joannis Alexandr. Brambilla Instrumentarium Chirurgicum Austriacum, 1782, p. 71. tab. x.

* Tom. ii. in 4°. p. 337. Paris. 1769.

† Guérin, Maladies des Yeux, p. 367, Lyon, 1769.

‡ Janin, Mem. sur les Maladies des Yeux, Lyon, 1772, p. 190.

†

Faye's

Faye's instrument, as described in the *Memoirs of the Academy of Surgery* *, be compared with this of my father, it will be sufficient to undeceive the reader. The same might be observed of the instruments recommended by Tenon †, Sharp ‡, and Tenaaf ||, all of which, indeed, bear a nearer resemblance to the instrument of La Faye, than to that of my father. There is one instrument, however, which has so striking a likeness to the latter, that it is, indeed, as exact as possible; and of this the reader may be convinced by perusing a small tract on the cataract, published at Gottingen, in the year 1770. The author of this tract was M. Richter, a German physician, who, when on his travels, made some stay in London, and there furnished

* Tom. ii. p. 565.

† Thèse sur la Cataracte, aux Ecoles de Chirurgie, Paris, 1757.

‡ Mem. de l'Academie de Chirurgie, tom. ii. p. 586.

|| Korte verhandeling door voorbeelden gesterkt, nopens de nieuwe wyze om de Cataracta, &c. door Gerard. Tenhaaf, &c. in 12° te Rotterdam, 1761, fig. 1.

Journal de Medicine, Aout. 1761.

himself, at Savigny's, a cutler in that city, with a dozen instruments, which were constructed for our use. Only a few months elapsed after M. Richter returned to Göttingen, before he published the pamphlet above alluded to ; in which he presented to the faculty our instrument, of which he appeared to claim the invention, notwithstanding my father had used it for more than twenty years before this time *.

I shall not detain the reader with a description of the instruments which have been employed by many different surgeons in this operation, such as those of Coutouly †, and Poyet ‡, men of distinguish-

* There can be no doubt, I think, that M. Richter assumes to himself the merit of inventing this instrument, since he often uses the expressions, *Cultellus noster*, and *Cultellus quo utor*, without mentioning my father's name. But I should not have noticed his want of candour in this respect, if many authors, and among the rest Krau-
sius, in his Notes on Platner Planck's Treatise on Surgery, &c. had not so far been misled by him, as to bestow on this instrument the unwarranted appellation of Richter's Knife.

† Thèse aux Ecoles de Chirurgie de Paris, en 1766.

‡ Memoires de l'Academie de Chirurgie de Paris, tom. ii. 17.

ed

ed eminence in the profession; because these bear no resemblance to the instrument we use; nor does the description of them constitute any part of the design of this treatise.

It cannot be doubted, that many oculists, who, since the time of Daviel, have invented new instruments, and described new methods of extracting the cataract, have exerted themselves in this manner, with a view, which is very laudable on some occasions, to excite the notice of the public; but unfortunately, the result of their efforts has not always been answerable to their wishes.

A few years since, M. J** announced to the public a new mode of operating for the cataract. He obtained permission from M. Morand, who at that time was surgeon-major of the invalids, to perform the operation in that hospital, which he accordingly did before Messrs. Louis, Sabatier, and many other celebrated surgeons. He made his first incision through the inferior part of the sclerotica, at the distance
of

of the twelfth part of an inch from the cornea, with an instrument resembling the ace of spades. This incision was sufficiently large to allow the admission of a second instrument, in shape like a small hook, fixed in a handle. M. I** made use of this to search, and as it were to fish for the chrySTALLINE; but unfortunately he, at the same time, fished out a large portion of the vitreous humour. He performed his operation on seven patients, neither of whom was restored to sight; but, in consequence either of the inflammation, the pain, the derangement of the internal parts of the eye, or the quantity of the vitreous humour that was discharged, the power of vision was irretrievably destroyed. My father, unable to resist the solicitations of M. Morand, operated, in the same hospital, on the same number of patients, and restored them all to sight. Since this time, it appears that M. J** has wonderfully improved his mode of operating. If we consult his treatise on disorders of the eyes, we shall find he makes no mention of the operation

operation I have above related, as performed by himself; but describes that which was performed by my father, to which he is pleased to give a decided preference*. His description, however, of the knife we use, and the fancied similitude he discovers between this instrument and that of La Faye, evidently shew that he is egregiously mistaken in his idea of it.

* Memoires sur les Maladies de l'Œil, p. 190.

S E C T. IX.

*Cases proper for the Operation of
Extraction.*

BEFORE I proceed to describe the mode of operating I have to recommend, it is necessary to point out the particular cases to which this operation is adapted, and in which it affords a prospect of success; and to distinguish them from those cases in which there is little ground of hope, as well as from those in which it is wholly improper to undertake it.

The following circumstances are generally favourable to the success of this operation.

The opacity of the chrystalline should be readily discerned, the subject healthy, the cornea transparent, and the other parts of the eye in their natural state. It is desirable also, that the eye-lids should be free from œdema, and that the eye should

E secrete

secrete its due proportion of tears; being neither too watery, nor too dry. When, on the contrary, the lids are *ædematous*, and the eye watery, depositions of matter sometimes come on, forming a species of *hypopion*, without violent pain, but almost always preventing the recovery of sight; especially if the means I have prescribed be neglected. In such cases I have always found it useful, eight or ten days previous to the operation, to apply a blister to the nape of the neck, and to keep up a discharge from the part on which the blister is applied, until the success of the operation shews it to be no longer requisite*.

* The Translator considers this as a very important remark. The cases to which the Baron here alludes are not uncommon, and the tumefaction of the lids is generally accompanied by an excoriation of their edges. Besides the use of blisters, and other general remedies, those local applications should also be employed which are most effectual to correct acrimony, and abate irritability; nor should the operation be undertaken till every symptom of disorder in the lids be fully removed. See, in connection with this subject, Remarks on the Ophthalmy, Ptorophthalmy, &c. by the Translator, second edition, published in 1787, by Dilly.

It

It is scarcely necessary to add, that proper internal general remedies should also be administered.

It is desirable that the patient be not subject to habitual pains in the head, since these pains sometimes return with great violence after the operation, and occasion some other very troublesome symptoms. I have observed that men are less liable to such pains than women, in whom they are commonly attended with more serious effects. It is just as necessary in this case, as in that last mentioned, to apply a blister to the nape of the neck, two or three weeks before the operation. The natural evacuations should also be promoted, particularly by purging; which I have found so beneficial, that, under these circumstances, it cannot be too strongly recommended.

Among the symptoms that promise success to the operation, a free motion of the pupil, and that degree of sensibility in this part, which manifests itself by its quick contraction, upon a sudden exposure to the

light, is very desirable. It should, however, be remembered, that some pupils retain the power of contracting and dilating, though the optic nerve be totally paralytic. This phænomenon will be clearly explained, upon attending for a moment to the structure of the eye. The motion of the pupil is produced by the action of the ciliary nerve distributed to the iris; and these spring from the semilunar or lenticular ganglion, which is formed by a junction of the nasal branch of the nervus ophthalmicus Willisii, or first branch of the fifth pair, with a branch of the third pair, or *motores communes*. Now, these nerves may retain their sensibility entire, and communicate it to the pupil, though the optic nerve, whose pulposus expansion constitutes the retina, or the seat of vision, may be in a state of total insensibility. In this state of the eye, it would be useless to perform any operation, though the pupil preserved its power of motion; and it may be known by the absence of those favourable symptoms I have mentioned in the beginning of this section, and by the total inability

inability of the eye to perceive the difference between day and night *.

Persons who are in the habit of attending disorders of the eyes, know well that these cases sometimes occur; though it much oftener happens, when the optic nerve is paralytic, that the pupil is nearly, not entirely, deprived of the power of motion.

There are, likewise, persons whose sight is good, and yet the pupils of whose eyes, upon the most attentive examination, in different degrees of light, discover no motion whatsoever. I have extracted the cataract from several eyes so circumstanced, and with the most perfect success. The following cases are adduced in support of this assertion; and it is confirmed by a remark I have repeatedly

* When one eye only is affected, and it becomes necessary to examine the pupil of this eye, care must always be taken to cover the sound eye. Without this precaution, there is danger of forming a mistaken judgment; since the pupil of the diseased eye will often borrow its motion from that of the sound one, if both are exposed at the same time, and the pupil of the latter still retains its faculty of moving.

made; that, after the operation has been most successfully performed, and the sight has been restored as completely as possible, the pupils have, notwithstanding, often remained almost without motion.

C A S E III.

My father having been sent for to Vienna, in the year 1760, to give advice to the Empress Queen, who had a considerable relaxation of the eye-lid (of which she was soon cured) operated, during his stay in that city, on the General-Marichal Molck, the pupils of whose eyes had no motion, and the chrySTALLINES were so black, that both the celebrated Van Swieten and De Haen imagined his disorder to have been a gutta serena. As, however, it appeared to my father, after the necessary questions, and a due examination of the eye, that the operation was likely to succeed, the General determined to submit to it. The cornea, and the anterior part of the capsule

capsule of the eye first operated upon were scarcely divided, when the chrystalline escaped through the incision with great velocity, fell at some distance from the patient, and broke into two parts. Upon examination, it was found to be almost black, firm, and of the consistence of plaister. The chrystalline of the second eye came out entire; my father taking care gradually to drop the upper lid, in proportion as the incision of the cornea advanced, in order to prevent its sudden expulsion. This was as black as the first, much more solid, and almost stony. The General had no bad symptoms after the operation, and in the usual course of time recovered his sight*.

It

* Though it cannot be denied that a cataract sometimes exists in an eye, whose colour is dark, yet this darkness is very different from the clear black appearance which the pupil has, not only when the eye is in a state of health, but also when it is affected with a true simple gutta serena; and if the cataract be in a state favourable to the operation, this opacity is rarely, if ever, accompanied with a fixed pupil.

E 4

Notwith-

It is surprising that the celebrated Pott should deny the existence of this species of the hard cataract*. Many examples, analogous to that which I have here recited, may be found in the works of St. Yves, Maitre Jean, and Gendron; and indeed, they happen so frequently, that there can be no reasonable doubt on this subject.

Notwithstanding the success, therefore, which attended the operation in the case described above, as well as in those cases which immediately follow, complicated as they were, not only with a blackness but immobility of the pupil, the translator is of opinion that they ought not to be adopted by practitioners as precedents, to which they may safely adhere in cases of a similar description. It is, on the contrary, a rule, as certain as almost any in surgery, that when an eye, in a state of blindness, is accompanied with a clear black pupil, which is incapable of varying its size, according to the degree of light to which the eye is exposed, this blindness is produced by a defect of sensibility in the immediate organ of vision, and removable only by the application of proper stimuli to rouse it again to its natural action.

* The Baron, in support of this censure on Mr. Pott, refers to the translation of his works into the French language, p. 501. The translator, however, is afraid that there is a mistake in the translation, as he cannot find such an opinion expressed in any part of Mr. Pott's original works.

CASE

CASE IV.

The late M. Recolin, member of the Academy of Surgery at Paris, had two cataracts, one of which was much more advanced than the other. The chrystalline of the eye, in which the cataract was completely formed, was extremely opaque, although the patient could distinguish day from night, and the shadow of the hand when moved before the eye. But of the different circumstances requisite to the success of the operation, one, which has usually been considered essential, was wanting; I mean the free motion of the pupil. As the pupil of the other eye, however, in which the cataract was only incipient, was also immoveable, my father determined upon the operation, which he performed in the presence of Messrs. Louis and Delaporte. It succeeded perfectly well, although the pupil still retained its fixed and motionless state. About

8 a year

a year afterwards, my father performed an operation upon the other eye, and with like success; the pupil, here also, remaining as immoveable after the cataract was extracted as it was before.

C A S E V.

M. Tonnelier, of the household of Madame Adelaide, of France, was in a situation nearly similar to that of the two persons, whose cases I have last described. He had been under the care of many oculists in Paris, all of whom had considered his complaint to be a palsy of the optic nerve. And under this idea, he for a long time used the various remedies that are recommended for this disease, but without effect. At last, he consulted my father, who encouraged him to hope for the restoration of sight by submitting to an operation. The patient, who had never before suspected he had cataracts, was the more gratified by this opinion, because the surgeons he had before consulted

consulted had never once suggested such an idea, and he had hitherto thought his malady to be absolutely incurable. My father performed the operation upon both eyes, and the patient afterwards distinguished perfectly every object that was placed before him. Both the chrySTALLINES were equally black *, and of a very hard consistence; and both pupils possessed a very small degree of motion. It was, doubtless, on account of the black colour of the cataract, and the immobility of the pupils, that the disorder had been considered as a gutta serena.

The preceding case shews that much experience and judgment are requisite, in order properly to distinguish cataracts, when

* This alteration in the colour of the chrySTALLINE must not be confounded with that of which Mr. Pott speaks, under the name of the *black cataract*; by which name the Germans understand a palsy of the optic nerve, or gutta serena. See Mr. Pott's Remarks on the Cataract. See also, Morgagni de Sedib. et Causis Morborum, Ep. xiii. p. 207. vol. i. in 4°. at Yverdon, in Switzerland; where the epithet of a black cataract is also given to a palsy of the optic nerve.

accompanied

accompanied with these symptoms, from other disorders of the eye. But I shall speak more particularly of this difficulty, and of the means of obviating it, in another part of this dissertation.

C A S E VI.

I was consulted by a young woman who had had a cataract in the right eye from the time of her birth. The pupil of this eye was fixed; but that of the left, the sight of which was perfect, retained its proper motion. Notwithstanding the want of motion in the pupil of the right eye threw an obstacle in my way, yet I determined to undertake the operation, because every other symptom encouraged me to entertain hopes of success. I found the forepart of the capsule not only opaque, but as hard as bone, and brittle. No instrument could puncture it; and at length the capsule came out of the eye entire, with the cataract contained within it. The cure
was

was not less perfect on this account; and the pupil, after the operation, became as moveable as that of the other eye, which was not diseased.

This case affords a proof that the immobility of the pupil is sometimes occasioned by the pressure of the anterior part of the capsule against the posterior surface of the iris. It will be seen, as I proceed, that this immobility of the pupil often accompanies the hydatid tumour, that is produced by a partial dissolution of the chrySTALLINE, whilst contained within its capsule; and, in this case, it is evident that the pressure of the projecting capsule against the surface of the iris, is the cause of its immobility.

To the cases here mentioned, I could add many others, which prove to a demonstration, that a fixed and immoveable state of the pupil, unless it be accompanied with other unfavourable symptoms, ought not to be regarded as an objection to the operation. The success attending it, when the pupil has been
thus

thus fixed, has often been as complete as when all the symptoms have been favourable; and we may be enabled to judge, if this immobility be a natural or preternatural state of the eye, by enquiring whether the sight be wholly lost, or whether any degree of it still remains; and also by observing, when one eye only is affected, whether the pupil of the sound eye be equally immoveable with that of the diseased eye.

It is not so easy to distinguish a black cataract from a gutta serena. Though the difference in the appearance of the eye in these two disorders be small, it may, however, be distinguished, by a careful observer; since the diseased chrySTALLINE has always a peculiar appearance, unlike to that of the bottom of the eye.

The colour of the chrySTALLINE is, in general, of very little consequence in the operation of extracting the cataract. When it is very white, and fills the whole aperture of the pupil, it is usually soft, and sometimes fluid; but under these circum-

stances it is more probable that the operation will prove successful, than when the chrySTALLINE is hard, because it comes out of the eye with less difficulty. It might be supposed, when the chrySTALLINE is soft, that it is unnecessary to make the incision in the cornea so large as when it is hard. But I am of opinion, that it is almost of as much consequence, that it be made large in this case, as when the chrySTALLINE is voluminous; and I will give my reason for this opinion. When the chrySTALLINE is soft, the viscous matter that accompanies it cannot always be extracted, even with the most diligent search, and the most skilful use of the curette: in fact, it sometimes continues to pass off gradually for four and twenty hours after the operation. But if the incision of the cornea be small, the aqueous humour, with which the viscous matter comes away, does not pass so freely as when the incision is larger, and consequently this matter may be retained within the eye; in which case it will obscure the sight if it do not entirely obstruct it. I am convinced,

by

by experience, that the operation requisite to this species of the cataract excites but little pain, and that the wound occasioned by it in the cornea is closed up very soon, without producing either an inflammation or staphyloma.

SECT.

S E C T. X.

On preparing Patients for the Operation.

HAVING pointed out the cases in which the proposed operation may be successfully practised, I should now proceed to describe the operation itself, were it not necessary, first of all, to add some remarks upon the means which it has been thought proper to adopt, in order to prepare persons for submitting to it.

It has usually been advised, to pursue a plan of preparation for some time before the operation is performed *. The means in common practice are bleeding and purging, together with a diluting and cooling diet. But if the patients, in other respects, enjoy a good state of health, I am fully persuad-

* Hoin, Memoire sur la Cataracte Capsul. in the Memoirs of the Academy of Surgery of Paris, vol. II. in 4°. 1769.

ed that such a regimen is at least unnecessary. In common cases, I think it sufficient that the patient should put his feet in a warm bath the evening before the operation, and have a glyster injected, in case the body be not open.

Plethora which tends to inflammation, acrimony, and heat, are the inconveniences chiefly to be guarded against; wherefore bleeding, and cooling remedies, may be omitted, unless the necessity of them be indicated by these symptoms.

If the *primæ viæ* be obstructed by indigestible substances, emetics and cathartics should be administered; but, where there is no such indication, they would produce more harm than good.

I should indeed advise, as a necessary precaution, to diminish the quantity of the patient's food, five or six days previous to the operation; and during this time, I usually prescribe a vegetable diet.

The proper season of the year for performing the operation, is still a subject of much conjecture. It is necessary, as much

as possible, to avoid very hot weather; because patients are in general obliged to keep in bed afterwards. Some have preferred the spring; but in cases of necessity all seasons are alike indifferent.

S E C T. XI.

A Description of the Knife we employ in dividing the Cornea.

ALTHOUGH the success of all surgical operations depends much more on the skill of the operator, than on the figure of the instruments he employs, yet these have their share in contributing to his success; and therefore they deserve a particular attention. It is a general observation, that instruments the most simple in their form are the best adapted to use: it is surprising, therefore, that surgeons should have been so slow in attaining to a sufficient degree of simplicity, in the construction of instruments for extracting the cataract. In this respect, I may venture to assert that no instrument is superior to that which was contrived by my father, and which he has now employed with success for upwards of five-and-thirty years. It is now where described but in a dissertation published

published by M. Richter, in the year 1770, who procured some of these instruments from our instrument-maker in London. But, as it is reasonable to suppose that the inventor should understand his own instrument better, and be able to describe it with more accuracy than his copyist can possibly do, I proceed to give the reader a particular description of it; and, in doing this, I shall take occasion to rectify some mistakes which have escaped the notice of the Gottingen physician.

This instrument, which, from its use in dividing the transparent cornea, might more properly be called *Ceratotome* than *Ophthalmotome*, resembles the common lancet employed in bleeding, excepting that its blade is a little longer, and not quite so broad. Its edges are strait; and if it has sometimes the appearance of convexity, like that in the figure which M. Richter presented to the public, this is owing to a fault in the maker. The blade is an inch and a half (eighteen

lines *) long, and a quarter of an inch (three lines) broad, in the widest part of it, which is at the base. From hence it gradually becomes narrower towards the point; so that this breadth of a quarter of an inch extends only to the space of about one-third of an inch (four lines) from the base; and, for the space of half an inch (six lines) from the point, it is no more than one-eighth of an inch (one line and a half) broad.

But, in order to convey a full idea of the shape and use of this instrument, its two edges must be described with still more accuracy than its length and breadth; because these are more immediately concerned in the operation. The lower edge, by which I mean that which is usually lowest during the operation, is sharp through the whole length of the blade. At the distance of a quarter of an inch (three lines) from the base, this lower edge has a slight projection, which is of

* A line is the twelfth part of an inch.

use in making the section through the cornea, as will be shewn more particularly in its proper place. The upper edge I describe as divided into three portions. For the space of five-sixths of an inch (ten lines) from the basis, this edge is blunt, and very slightly flattened. For the space of half an inch, or rather six lines and a half, further, towards the point, it is blunt and rounded; although to the naked eye this part appears sharp, on account of its being very thin. And the extremity of this edge, to the extent of one-eighth of an inch (one line and a half) from the point, is keen like the lower edge, in order to facilitate the conveyance of the instrument through the cornea,

It may be useful here to take notice of the projecting part of our instrument. This sometimes appears greater than it really is, in consequence of the instrument-maker's narrowing the blade too much from its broadest part to its basis. Since the whole length of the blade is never used in the operation, and since, in dividing a

cornea of the largest size, no more than from ten to twelve lines of it, at the utmost, can be employed, that part of the instrument which is nearest to the handle is of very little importance; and the instrument-maker, by giving it more or less breadth, will cause the part of the instrument in the middle division to appear more or less projecting. This I suppose to have been the case with the instruments which M. Richter procured from our cutler in London. In the figures he has delineated, that which represents the instrument plunged into the cornea, is perfectly similar to ours; whilst the edge of that which is delineated singly, has too great a degree of convexity. The middle part of his blade, on the flat side, is represented as having a kind of swelling to denote its thickness. This has no other use than to give a little more strength to the instrument, to prevent its bending; and M. Richter is mistaken when he asserts, that this thick part of the blade is designed to keep the instrument at a distance from the
iris,

iris, and so to prevent this membrane from being wounded *. Far from preventing such an accident, we are of opinion, that this fulness of the blade would rather tend to produce it. But all instruments, without care, are apt to occasion this accident; it may, however, always be obviated by a dextrous operator, and is not to be apprehended, if the mode of operation which I am about to describe, be adopted. In short, this swelling in the middle of the blade is merely intended to prevent the instrument from breaking, which might otherwise happen, if its point should be entangled, as I have sometimes seen it, in the tough edge of the sclerotica, which incloses the border of the cornea.

The blade of the knife should be made of well-tempered steel, in order that it may take a good polish, and have a sharp point and edge.

The handle, in which the blade is fixed, has eight sides, which are alternately large and small; or, rather, it is a quadrangular

* Fascicul. de Cataract. p. 26. Gottingen, 1770.

*

prism,

prism, whose four angles are cut off, and slightly rounded. In this form it appears to us more convenient than when it is cylindrical; because it may be held more firmly between the fingers; and because it is not so apt to turn round in the hand. It is generally three inches and two-thirds in length, and from two lines to two and a half in thickness. The blade is so fixed in the handle, that the two sides of the former lie parallel with the broadest sides of the latter. On the upper side of the handle, which answers to the upper or blunt edge of the knife, a small mark is placed, which directs the proper manner in which the instrument should be held in performing the operation*.

The same instrument is adapted to both eyes; and it is directed with equal facility by the right-hand and the left. It is, nevertheless, proper that the operator should be provided with several instruments, as the same ought never to be used on both eyes, even

* See the figures, and their explanation, at the end of this treatise.

when

when the operation is performed on both, in succession, in the same day. Whatever care may be taken to cleanse it, the blade, after the first operation, is soiled with an unctuous greasy substance, which prevents it from cutting clean; and repeated observation convinces me, that the blade cannot be so perfectly cleansed from this unctuous matter adherent to it, as that it may be again fit for use, until some hours after the first operation.

Such is the form of the instrument invented by my father. The accurate description I have given of it sufficiently points out its simplicity and its advantages. It bears no resemblance to any of the instruments proposed by other surgeons. Its shape is well calculated to effect the division of the cornea with the utmost ease and safety, as it cuts this membrane in proportion as it enters into the eye; and the aqueous humour cannot escape, at least not in a considerable quantity, until the knife has made its way quite through this tunic. It cuts only with its lower edge; and the
upper

upper edge, being blunt, can do no injury to any part with which it may come into contact. It has one striking advantage over the instrument invented by De la Faye, with which it has been improperly compared *; and this is, that when it has penetrated the anterior chamber, it is equally distant from the iris in every part, and may easily be brought out of the cornea, on the inside next the nose, exactly opposite to the point by which it entered this tunic; an advantage which our straight blade must necessarily possess over a curved blade, like that of M. de la Faye. It is needless to observe, that it differs very much from that of Beranger, in which the convexity of the edge is so considerable, that it renders it difficult to divide the cornea, as it presses against, rather than cuts through this tunic. Beranger's instrument has also a tendency to force the eye into the inner angle of the orbit, and consequently it occasions the greatest difficulty in bringing the knife

* See Guerin's *Maladies des Yeux*, and Janin's *Maladies de l'Œil*.

properly

properly through, on the inner side of the cornea *.

S E C T.

* The Translator begs leave to observe, that the knife which he has been in the habit of using (see Fig. XV. in the annexed plate) is, in regard to its dimensions, not unlike the instrument employed by the Baron. The principal difference between them consists in this circumstance; that the Translator's knife is less spear-pointed; in consequence of which, when this latter instrument has pierced through the cornea, its lower, or cutting edge will sooner pass below the inferior margin of the pupil, than that of the Baron represented in Fig. I. &c. in the same plate. On this account the Translator is of opinion that the iris will be less likely to be entangled under the use of the knife now recommended, than under that of the Baron, when the instrument begins to cut its way downwards, and the aqueous humour is discharged.

The Translator has only to add, on the construction of the knife, that great care should be taken to have it increase gradually in thickness from the point to the handle; by which means, if it be conducted steadily through the cornea, it will be next to an impossibility, that any part of the aqueous humour should escape, before the section is begun downwards; and consequently, during this time, the cornea will preserve its due convexity. But if, on the contrary, the blade be so formed as not

S E C T. XII.

*On the Inutility and Inconveniences
of Specula.*

IT is very extraordinary, that amongst the eminent persons who have described the operation of extracting the cataract, most of them have enumerated amongst its principal difficulties, the quick and convulsive motion of the eye; and that they should have taken so much pains to contrive instruments for the purpose of fixing it. Long experience has taught me, that these instruments are always unnecessary, and that a dextrous person may, in every case,

to increase in thickness from the point; or if it be incurvated much in its back or edge, it will unavoidably happen, that the aqueous humour will be spilt before the puncture is completed; and the iris, being brought under the edge of the knife, will be in great danger of being wounded by it.

as

as I shall describe more fully hereafter, easily seize a moment to perform the operation, in which the eye is motionless. The different instruments which have been contrived to fix it, not only render the operation more complicated in itself, more dreadful to the patient, and more embarrassing to the operator, but they are also very liable to irritate and wound the eye. On these accounts they have been relinquished by almost all operators; and even by the inventors themselves. This has been the fate of the instruments contrived by Beranger, Guerin, Pope, Petit, Le Cat, and many others, of which I shall take no further notice at present. The needle invented by M. Poyet, which has a hole pierced in it near the point, does not answer its intended purpose, at the time when its assistance is wanted; since, before the thread which is to fix the eye can be disengaged from the needle, this instrument must be passed through both sides of the cornea*:

* See les Mem. de l'Acad. de Chir. vol. ii. p. 353.

and

and it is then needless to use any particular means for this purpose; because the instrument employed to divide the cornea, when it has been carried through the anterior chamber, and its point is come out on the side next the nose, will of itself fully answer this intention. An eye thus traversed may readily be disengaged from the great angle to which it retires, and be brought back again to the position that shall be most convenient for completing the incision.

The instrument called *la Pique*, invented by M. Pamard, a surgeon at Avignon, has suggested the idea of most of the specula invented since his time; and this may seem less exceptionable than many prior inventions. But, if we consider it attentively, we shall find, that the great distance at which the hand of the operator must be held from the eye, will render it very difficult for him to direct the instrument properly; so that, on this account, the operation will necessarily be impeded by it. M. Rumpelt has in some measure guarded

guarded against this defect, in the instrument invented by him, (see fig. 12. in the plate annexed) which is nothing more, as described by Feller, in 1782 *, than a thimble, at the end of which is a sharp-

* See the figure of this instrument, in a treatise on the cataract, published at Leipzig, which has for its title, *Libell. de Methodis Suffus. Oculor. curandi à Casa amata, et Simone cultis*, published by *Christian Gotthold. Feller* 1782. Krausius, in his Notes on Platner's Institutes of Surgery, expresses himself in the following manner on this instrument.

“ *Hastulam Pamarti applicatam generi cuidam digitalis ferruminando jussit jungi Rumpeltus, chirurgus dexterrimus. Digitale id digito medio aut annulari impositum mucronem hastulæ in eodem loco bulbi imprimit, dum interea digitus index manûs ejusdem palpebram inferiorem diducit. Similem quidem hastulam, vel si mavis unum habet ferramentum quo casa amata ad bulbum oculi stabiliendum utitur. Id bis flexum refert figuram literæ Romanæ S, in cujus capite est hastula illa. Iconem apud Fellerum, l. c. inspice. Cuspis autem ferramenti imprimitur non in conjunctivâ sed in corneâ, eo quidem loco qui à conjunctivâ dimidiam lineam distat et punctum illud in quo cultellus corneam pertundit et ingreditur è diametro spectat. Scalpelli Chirurgus ita promovet, ut is eo ipso loco corneæ ubi hastula impressa est, è camera oculi egrediatur. Cavetur sic conjunctivæ, cujus, utpote sensilioris, læsio alioquin inflammationem augere potest.*”

G

pointed

pointed instrument like the pique of Parmard. This thimble is to be placed on the middle finger of the operator. Now, if we could approve of any sort of speculum, we should certainly give the preference to this, because it does not obstruct the use of the fore-finger, but leaves it at liberty to keep down the lower eye-lid.

Some among the moderns have supposed that the use of specula is proper during the section of the cornea, in order to prevent the iris from being wounded; which accident, they think, is particularly to be apprehended when the eyes have a quick motion. But experience shews, on the contrary, that such instruments are more frequently the cause of this accident than the means of preventing it.

The most simple, as well as the surest method to avoid wounding the iris, when it becomes entangled under the edge of the knife, is to press the iris gently down with the fore-finger applied over the cornea, at the same time that the middle-finger is employed in keeping the lower lid from
rising.

rising. In consequence of this, the iris will instantly be found to retire, and quit the knife, which is then steadily to be pushed on, until the incision be completed. If the fingers of the operator were engaged in holding a speculum, the operator could not have recourse to this mode of liberating the iris; and therefore, by using such an instrument, he would be in greater danger, than if he did not use it, of cutting this membrane. Though the speculum of M. Rumpelt be fitted to the middle-finger, yet the fore-finger, by means of it, will be kept at so great a distance from the cornea, that it cannot properly assist in disengaging the iris; and even if it could be brought nearer, still it would often be useless; because in cases where the instrument is much entangled in the iris, both fingers are necessary to disengage it, and therefore both should be entirely at liberty. I need not add, that, besides this inconvenience, which has led us always to shun the use of instruments for the purpose of fixing the eye, the speculum of M. Rumpelt further

partakes of the inconvenience which is common to all specula, that of rendering the operation complicated and intricate: and this is a circumstance very much to be dreaded if the patient falls into the hands of an unskilful operator; since, by means of it, he may irritate and inflame the eye, and, by a very slight pressure, rupture the capsule of the vitreous humour, which, in some species of the cataract, is remarkably tender.

I might here add some other general remarks on the instruments constructed for the purpose of fixing the eye; and I might dwell on the great difficulty under which the operator who employs them labours, from the want of a free, unconfined, and unembarrassed use of both hands. This constraint might, doubtless, give occasion to no small inconvenience. But, waving this, it is evident that the point of Rumpelt's instrument must necessarily irritate and lacerate the membrane to which it is applied, although the object of fixing the eye, by this means, be really

ly attained. I may be told that the cornea is totally insensible, and that no mischief is to be apprehended from its being punctured. The uneasiness produced by foreign substances adhering to it*, by the

* Various authors have related cases in which foreign substances, having insinuated themselves into the eye, have become attached to the transparent cornea. I have seen many of these, and believe it to be an accident which happens much more frequently than is commonly supposed, especially among artificers who work in iron and steel. Among many instances which I could enumerate, if it were my design to treat of this particular subject, I shall select one which is very remarkable.

In the year 1784, Mad. Thaurin, in the Ruë du Jour, consulted me on account of her nephew, a little boy, who had a singular complaint in the left eye. A round yellowish spot was perceived on the cornea, elevated above its surface, and resembling a small bladder. From this spot proceeded a number of varicous vessels, diverging like radii from a center. The cornea being, in a great measure, covered by these, the eye was almost wholly deprived of sight. The child had been under the care of several oculists in Paris, who had considered his disorder as a *phlyctene*, or blister on the cornea, and had accordingly, for many months, prescribed remedies for its removal, without the smallest success. On carefully examining the eye, I could not conceive the complaint to be a mere blister, because of the yellow colour

the eye-lashes when turned inward, and rubbing upon it, and by various other causes,

of the spot ; and having occasionally seen many cases of a similar nature, it struck me, that the projection, in this instance, might possibly be produced by a foreign body fixed on the cornea. I was encouraged in this opinion by considering, that the child suffered very little pain ; that the light did not much affect the eye ; and that the remedies applied had produced no effect. To ascertain this circumstance, I touched the spot repeatedly, but with much difficulty, on account of the untractableness of the child, with the golden needle, which we use in operating for the cataract ; and, after several attempts to detach the foreign substance, I at length happily succeeded, and completely removed it from the cornea. I found it, upon examination, to be a part of the hard skin of a millet seed ; which, having fallen into the child's eye, stuck in the cornea in such a way that its sharp edge and concave side adhered to this membrane, while its smooth and convex surface made a slight projection outwards. The accident had happened about four months before I was consulted, at the time the child was looking up at a cage, from which a bird was scattering the husks of millet seeds after he had bruised them with his bill. This skin had, by degrees, made its way into the cornea, in consequence of the repeated pressure of the eye-lids, and its colour had misled the practitioners, who, at first, had the care of the child. After having removed this foreign substance, I perceived a cavity in the center of the varicous vessels, which plainly pointed out the place where this substance had been lodged. I applied nothing

causes, daily contradict this assertion. The formation of the unguis, and the elongation of its varicous vessels over the cornea, fully prove, not only that the conjunctiva is continued over the cornea, but also that this tunic is highly sensible. A puncture of it cannot therefore be looked upon as an indifferent circumstance. And, besides this objection to Rumpelt's instrument, the pressure made at one and the same time, in two opposite directions, on one side by the speculum, and on the other by the knife, must occasion the aqueous humour to escape with great rapidity as soon as a passage is opened for it. In consequence of this, the iris coming forward will not only be in danger of getting under the edge of the knife, but of being totally enveloped by it; and, in this last case, its division will be almost inevitable. The time when it is of peculiar im-

to the eye but common fresh water. The cause that had produced and continued the disorder being removed, the varicous vessels subsided of themselves, and in a very few days no trace of the accident remained, and the sight of the eye became as perfect as ever.

portance to have the eye steady is, when the knife, having passed through the anterior chamber, is on the point of piercing through the inner side of the cornea, in order to complete the incision of this tunic. Now, when a speculum is used, the whole compression, at this instant, will be on the inside of the cornea; and, if the eye be subject to convulsive motions, it will, at this time, as I have occasionally seen, give a sudden turn towards the instrument. Again, when the aqueous humour has been prematurely squeezed out by the pressure of the speculum, before the knife has pierced through the inner side of the cornea, this tunic becoming flaccid, the passage of the knife through it has often been rendered extremely difficult.

From what has been said, I think it is evident that none of the instruments above mentioned are competent to the purpose of fixing the eye at the instant when it is most desirable that this end should be obtained. I am persuaded that no one will make use of them, when once he has
given

given them a fair trial, and has proved by experience their many inconveniences. It is likewise my invariable opinion, that the fewer instruments are employed,—the less the eye is fatigued,—and the more simple the mode of performing the operation,—the more certain will always be its success. Instruments to fix the eye may possibly be used with safety, when they are applied to an eye naturally steady; though, even in this case, it will be better to reject them. And when, on the contrary, the eye, on being touched, is liable to a convulsive motion, the application of instruments to confine it will be found nearly as difficult as the operation itself; and the points of these instruments, during the quick motions of the eye, will, almost unavoidably, injure the parts to which they are applied.

In short, as the chief motive for recommending the use of a speculum is to avoid injuring the iris, during the incision of the cornea, it cannot too often be repeated, that this accident arises, more frequently, from the application, than from the dis-
use

use of such instruments. With a proper degree of attention there is no danger of wounding this membrane, even when the knife is entangled in it, if the operator only remembers gently to press down the cornea with his finger, and pursues the incision without hesitation; but, in such a case, to withdraw the knife, in order to finish the incision by the application of the scissars, would be highly improper, and must carefully be guarded against*. I shall

* The Translator, for the most part, assents to what is advanced by the author in this section, in regard to the subject under immediate discussion. At the same time he must observe, that in some instances of children born with cataracts, he has been under the necessity of having recourse to the use of a speculum, in order to fix the eye; without the aid of which, he has found it totally impracticable to make the incision through the cornea with any degree of precision or safety. The speculum he has employed on such occasions, is an oval ring, the longest diameter of which is about twice as long as the diameter of the cornea, and the shortest about half as long again as this tunic. Annexed to the upper rim of the speculum is a rest, or shoulder, to support the upper eye-lid; and, by its lower rim, it is fixed to a handle of such a length, and bent in such a way, as may render it convenient to be held in the hand of the operator.

shall now adduce a few cases in support of the preceding observations.

CASE VIII.

Monf. ***, a physician at Droit, furnishes an instance of the convulsive eye, described in the preceding section. He had had a cataract extracted from the left eye, by an oculist at Paris, without success. My father, afterwards in the year 1784, performed a similar operation on the right eye. He at first simply divided the cornea, without attempting, at that time, to pierce the capsule of the cataract. This he afterwards accomplished with a sharp-

rator. With an instrument of this shape, which he believes was first used by the late Mr. Elfe, he not long since fixed the right eye of a young lady, about fourteen years of age, which was remarkably unsteady, and extracted from it a solid cataract with great ease and success. About two years prior to this operation, a pulpy cataract had been extracted from the same young lady's left eye by a French oculist, who was then in Scotland; but the operation was extremely tedious, and afterwards the pupil unfortunately closed; so that, of course, the patient received no benefit from it.

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pointed

pointed golden instrument, in shape somewhat resembling a needle. The muscles both of the eye-lids and globe of the eye were highly irritable ; and, during the incision of the cornea, the aqueous humour escaped with so much rapidity, that the knife was totally enveloped in the projecting iris. My father, however, disengaged this membrane from the instrument, by gently rubbing his finger on it over the cornea ; and he afterwards finished the operation without the smallest accident.

In this example, if my father's hand had been embarrassed by holding a speculum, it would have been impossible to avoid hurting the iris. It was, probably, the fear of this accident which prevented the oculist who performed the first operation from making the incision of the cornea so large as it ought to have been. This I infer from an inspection of the cicatrix in the left eye. The difficulty with which the opaque crystalline came through so small a wound was, without doubt, the cause of the violent and destructive symptoms that followed,

lowed. The operation which my father performed on the other eye was attended with no one disagreeable symptom, and at length was crowned with the fullest success.

C A S E IX.

Madame ***, the muscles of whose eyes and eye-lids were strongly disposed to be convulsed on the slightest occasion, had a complete cataract in the left eye, which was operated upon some time past, by an oculist in Paris. The operation was followed by very severe symptoms; and, at length, after the patient had suffered the most excruciating pain, a suppuration took place in the eye. After all that I could collect from the account given me by the lady herself, and by those who were present at the operation, of the method in which it was performed, I conclude, that as soon as the incision of the cornea was commenced, the eye became convulsed, and the aqueous humour

humour instantly escaped. Upon this, the vitreous humour, in consequence of the contraction of the straight muscles, came forward, and forced the iris upon the instrument; which, being thus entangled, the operator, perhaps unacquainted with the means of disengaging it, was obliged to make the section of the cornea too small in order to avoid wounding it. The efforts necessary to bring the cataract through this confined aperture, no doubt, excited a violent inflammation and pain; and these terminated in a suppuration, and consequent destruction, of the whole globe of the eye. The extraction of the cataract from the right eye was performed by me. At the time of the operation, this eye was convulsed for some minutes; but, watching my opportunity when it was quite still, I made the incision through the cornea without attempting, as in common cases, at that time, to puncture the capsule of the crystalline. Notwithstanding all the dispatch I could use, in this first part of the operation, my knife was quite entangled in

in the iris. I disengaged it, however, by rubbing the cornea in the manner I have before advised; and the section of the cornea was large enough to give a free passage to the cataract, after I had punctured the capsule of the crystalline by means of the golden needle. In fifteen days, the lady was perfectly cured, and was afterwards able to read even a small print.

After what has been stated, I have reason to believe, that if my right hand had been embarrassed by any instrument whatever, I should not have been able to disengage the iris from the knife; and, under a fear of wounding this membrane, it would have been very difficult for me to have made the incision in the cornea sufficiently large. In consequence of this, the great pressure I must have used to bring a large and firm crystalline through a small incision, would have excited a considerable inflammation, acute pain, and probably a suppuration in the eye; by which means this eye, without doubt, would have been destroyed, as the left had been before.

C A S E

C A S E X.

M. F**, in the Ruë des Noyers, like the two patients just mentioned, was subject to a great degree of irritability in the eyes. The muscles both of the lids and globe of the eye were so strongly contracted, that I had great difficulty to support the upper lid with my finger, whilst my father performed the operation on the right eye, in the year 1779. The same obstacles occurred as in the former cases, and the same methods were adopted with a view to surmount them. The section of the cornea was completed, without attempting, till afterwards, to puncture the capsule of the crystalline, which was then easily accomplished by means of the needle. The operation, which was performed in the presence of my colleague, M. Navier, was attended with perfect success, and the patient was cured in the course of twelve days, without any material accident. The left eye, which had
been

been operated upon twelve months before, by an oculist in Paris, had suffered much from severe pain and a very violent inflammation, which terminated, at length, in its suppuration and destruction. These accidents were, doubtless, occasioned by bringing the cataract through too small an incision in the cornea.

C A S E X I.

The late Princess de Rohan-Guemené, from whose left eye my father extracted a cataract with success, in the year 1776, affords a striking example of this extreme irritability of the eye. Her eyes were naturally very large and prominent; and, during the incision of the cornea, the contraction of the muscles of the lids, and of the straight muscles of the eye, pressing on the vitreous humour, pushed the iris so far forwards against the knife, that the instrument seemed to be entirely enveloped by it; but, on my father's making a gen-

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the friction on the cornea downward, this membrane quickly contracted, and left the edge of the knife free. The back of the knife being blunt, as I have already described it, any attention to the upper part of the iris, which pressed upon it, was needless. When the section of the cornea was completed, the capsule of the crystalline was punctured with the gold needle; and afterwards, during the extraction of the cataract, the vitreous humour, which repeatedly pushed against the aperture of the cornea, was prevented from escaping by the upper lid, which was gradually closed, according as the cataract came through. This, though large, was extracted with tolerable ease. In a fortnight, the Princess was perfectly cured; and, at the end of a month, she could read the smallest characters with the help of proper glasses.

In this operation, the use of a speculum would have embarrassed my father's fingers, and much interfered with their free action in disengaging the iris from the knife. By the pressure it must have made on the eye,

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during

during the incision of the cornea, it would, also, most probably, have forced out the cataract suddenly, and with it a portion of the vitreous humour; a slight compression being often sufficient to rupture the membrane of the vitreous humour, when this body is voluminous, and when the muscles of the eye act powerfully upon it; and, in some cases, even without a speculum, the contraction of the muscles of the eye is so strong, that unless the greatest care be taken to drop the upper lid, as the operator proceeds in dividing the cornea, the cataract, pushed forwards by the vitreous humour, will suddenly burst its capsule, and follow the instrument, together with a considerable portion of this humour. This is particularly to be apprehended in that species of the cataract, which I shall hereafter describe under the name of the hydatid cataract.

CASE XII.

The late Cardinal de Rohan, Bishop of Strasbourg, was precisely in the same situation with the Princess de Rohan. It was extremely difficult to fix his eyes, which were instantly convulsed as soon as they were touched. My father, who had been sent for to Strasbourg to see the Princess Poniatowska, niece to the King of Poland, was consulted by the Cardinal, and entrusted with the care of the operation, which he accordingly performed upon the right eye, in the presence of many physicians of that city. The same difficulties occurred in this, as in the preceding case; and they were happily subdued by the same means. The only imperfection after the operation was a slight staphyloma, which remained a longer time than is usual. My father, being obliged to return to Paris, after three weeks stay at Strasbourg, and, convinced by long experience, that
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the air, and gentle frictions on the cornea, would soon reduce this hernia, advised the Cardinal to make no application to the eye on the account of it. But the person who attended, and who was entrusted with this direction, unwilling to appear wholly useless, applied compresses on the eye, and used a variety of other means; which, in fact, only tended to torment the patient, and to retard the reduction of the tumour. This, when all other applications were laid aside, took place of itself, as my father had predicted, and, in six weeks after the operation, the Cardinal was able to read, with the assistance of glasses, as well as could be wished*.

* It should be remembered, that the word, *staphyloma*, is used by authors, at different times, to denote two different diseases. One of these is a projection either of the whole, or of a part, of the tunica cornea, and accompanied sometimes with a projection of part of the sclerotica also. The other, which is the disorder the Baron here means, is a protrusion either of an opaque or transparent membrane through an aperture in the substance of the cornea. When the protruded membrane is opaque, the disorder is always accompanied with an alteration in the figure of the pupil, and the tumour is

evidently formed by the removal of a part of the iris from its natural situation. When, on the contrary, it is transparent, the French writers on this subject usually call it, with Baron de Wenzel, a protrusion, or hernia, of the membrane of the aqueous humour. The Translator, however, having never been able to discover this membrane in the eye of any animal after death, is not yet satisfied with regard to its nature; and, he still doubts whether the transparent projection above mentioned, be any thing more than an inspissation of the substance, which is secreted through the sides of the divided cornea to form the connecting medium, and which is gradually stretched and pressed out by the aqueous humour behind it. It is not uncommon for this projection to appear after the operation of extracting the cataract. The Translator has met with it in several instances, and in some of these the operation has been performed by the Baron's father. But though exposure to the air, and frictions on the eye, have occasionally been sufficient to accomplish its reduction, as in the case here described, he has, in more than one instance, been obliged, in consequence of its long continuance, gently to touch its surface with the causticum lunare; immediately after the use of which, a few drops of water should be dropped into the eye, to prevent its influence from extending too far; and by this method, he has evidently hastened its reduction, and expedited the cure. This remedy, when applied in the gentle manner the Translator here recommends, produces no slough, and gives much less pain than might be imagined by those who are unaccustomed to its use on such occasions. The temporary inflammation which it excites, he believes to be of use, as it is accompanied with a contractile action in the morbid part,

part, which tends to reduce it to its proper dimensions. It goes off in a short space of time; and, in general, the application may be repeated every second day, until the cure be completed. He does not mean, however, to confine its use to those cases in which the protruded part is transparent. He has also occasionally employed it with great advantage when the projection has been opaque, and was evidently formed by a part of the substance of the iris. See a case of this kind in his Remarks on the Ophthalmy, &c. p. 82 of the 2d edition,

S E C T. XIII.

*On the Mode of performing the
Operation in common Cases*.*

W H E N the patient is judged to be in a state fit for the operation, and has been duly prepared for it in the manner I have already described, let him be seated in a low chair, before a light which is not too bright and active. We have always observed that, in a moderate light, the patient is more calm and tranquil; and this is also favourable for the incision of the cornea, because it does not occasion too great a contraction of the pupil†. The sound eye being

* The Translator has given a title to this section agreeable to the literal meaning of the author's words. He cannot but be of opinion, however, upon a careful examination of its contents, that it would more properly be entitled,—*On the Mode of dividing the Cornea, and puncturing the Capsule of the Crystalline Humour, in common Cases.*

† I shall not here enter into an anatomical enquiry concerning

being covered with a comprefs retained by a bandage, an affiftant, placed behind, muft hold the patient's head, and fupport it on his breaft. With the fore-finger of the hand that is at liberty, he is then to raife

concerning the caufe of the contraction of the pupil; nor fhall I fay any thing about the contracting and dilating mufcles of the iris, the exiftence of which has been fupposed by many anatomifts. It appears to me much more probable, that the action of this membrane depends upon its vafcular and nervous texture, and not upon any real mufcular fibres, fince thefe have never been perceived by the moft celebrated anatomifts. See, on this fubject, Duverney (*a*), Morgagni (*b*), Mery (*c*), Winflow (*d*), Ferrein (*e*), Haller (*f*), Zinn (*g*), Warner (*b*), Porterfield (*i*), Senac (*k*), and Mauchart (*l*).

(*a*) Hiftoire de l'Academie des Sciences, 1678. p. 247. in 4^o.

(*b*) Adverfar. Anat. vi. Animadv. 69, 70. p. 227. Venetiis, in fol. 1762.

(*c*) Mem. de l'Acad. des Sciences, 1704. p. 261.

(*d*) Mem. de l'Acad. des Sciences, 1721. p. 318.

(*e*) Mem. de l'Acad. &c. 1741. p. 381.

(*f*) Herman Boerh. Prælect. Academ. vol. iv. p. 107. in 12^o. Leyden, 1758.

(*g*) Descript. Anat. Ocul. Human. p. 91. Gottingen, 1755.

(*b*) Description of the Human Eye, p. 67. London.

(*i*) A Treatife on the Eye, the Manner and Phænomena of Vifion. Edinburgh, 1759. vol. i. p. 153. in 8^o.

(*k*) L'Anatomie d'Heifter, avec des Effais de Phyfique, in 8^o. p. 692. Paris, 1735.

(*l*) Differtat. de Mydriafi, feu pupillæ præter natur. dilatatione. Tubing. Mart. 1745. p. 52. feft. 26.

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the upper lid of the eye to be operated upon, and gently to press the tarsus, with the extremity of the finger, against the upper edge of the orbit. In order to assist this arrangement, and properly to fix the upper lid, the assistant should take care to draw up the skin over the orbit, and strongly to fold the teguments that support the eye-brow. By this method, the eye will be entirely uncovered, an undue pressure upon it will be avoided, the fingers of the assistant will not interfere with those of the operator, and the eye-lid will be so fixed, as to be incapable of any motion*.

The operator is to be seated on a chair, a

* It is of importance, if possible, to procure an assistant, who is well acquainted with the operation, and even in the habit of performing it. Such a person alone is competent to follow the motions, and to accommodate himself to the wishes of the operator, by widening or closing the lids as circumstances may require, and, in a word, by executing the different movements which tend to aid and facilitate the progress of the operation. With the advantages of such an auxiliary, the difficulties of the operator will be greatly diminished, and he will often be preserved from much, otherwise unavoidable, embarrassment.

little

little higher than that of the patient. The eyes naturally turning towards the light, he is to place the patient's head obliquely to a window ; so that the eye to be operated upon may be inclined towards the outer angle of the orbit. This position of the eye will enable the operator to bring out the knife, on the inner side of the cornea, opposite to the part where it pierces this tunic, more exactly than he would otherwise be able to do. The operator is to rest his right-foot on a stool, placed near the patient, that his knee may be raised high enough to support the right elbow, and to bring the hand with which he holds the knife to a level with the eye on which he is to operate *. He

* I have learnt from long experience, that this position, both of the operator and the patient, is preferable to any other that can be proposed. In the first place, the operator is seated perfectly at his ease, which, as surgeons well know, is essential to the right performance of every operation ; and, in the next place, the position of the patient is better calculated than any other in which he can be placed, to prevent accidents during the operation.

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is then to take the cornea knife in his right hand, if it be the left eye on which he is to operate, and, *vice versa*, in the left hand, if it be the right eye. The knife is to be held like a pen in writing; and his hand is to rest steadily on the outer side of the eye, with the little finger, separated a little from the rest, on the edge of the orbit. In this position he is to wait, without any hurry to begin the incision, until the eye, which is usually very much agitated by the preparations for the operation, becomes perfectly still. This always takes place within a few seconds of time; and, therefore, as I have already fully expressed myself on this subject, every instrument invented to fix it, is useless.

When the eye is still, and so turned towards the outer angle of the orbit, that the inner and inferior part of the cornea, through which the point of the instrument is to come out, may be distinctly seen, the operator is to plunge the knife into the upper and outer part of this tunic, a quar-

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ter of a line distant from the sclerotica, in such a direction that it may pass obliquely from above, downwards, parallel to the plane of the iris. At the same time, the operator must depress the lower lid with his fore and middle fingers, which are to be kept a little distant one from the other; and must take the greatest care to avoid all pressure on the globe, which is to be left perfectly free, as the surest way to diminish its power of moving*.—See fig. 4.
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* The Translator has so often perceived the ill effects of leaving the eye unfixed, while the incision is made through the cornea, that, for many years past, he has pursued, with no small degree of success, a method different from that here recommended by the Baron; and, as this is a part of the operation highly necessary to its success, he begs leave to explain himself, by going into a minute detail of his ideas upon the subject. It should be remembered, that the danger likely to arise from undue pressure, can alone take place after the instrument has made an opening into the eye: and when the Translator recommends pressure as necessary to be employed, in order to fix the eye, he would be understood to mean, that this pressure should be removed the instant the knife is carried through the cornea, and before any attempt is made to divide this tunic downwards. But, to be more clearly understood, he would suppose,

in the plate annexed, which represents the position of the knife, at the instant when it pierces the cornea.

When

suppose the incision of the cornea to be divided into two distinct processes; of which the first may be called Punctuation, and the second, Section (*a*). So long as the knife, described in p. 77, fills up the aperture in which it is inserted, that is, until it has passed through both sides of the cornea, and its extremity has advanced some way beyond this tunic, the aqueous humour cannot be discharged, and pressure may be continued with safety. This part of the process, the punctuation of the cornea, being completed, the end and design of pressure is fully answered; and if it be continued when the second part of the process, or section of the cornea, begins, instead of serving any good purpose, it will most certainly produce effects of the worst kind. To avoid these, the Translator recommends the incision to be made through the cornea in the following manner.

The operator, being conveniently seated for operating, is to place the fore and middle finger of the left hand upon the tunica conjunctiva, just below, and a little on the inside of, the cornea. At the same time, the assistant, who supports the head, is to apply one, or, if the eye projects sufficiently, two of his fingers, upon the conjunctiva, a little on the inside and above the cornea. The fingers of the operator and assistant, thus opposed

(*a*) See a similar description of this part of the operation, in a Dissertation on the Cataract, by the Translator's late partner, Mr. Wathen, p. 99. published in 1785, by Cadell;

When the point of the knife has proceeded so far as to be opposite to the pupil,
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to each other, will fix the eye, and prevent the lids from closing. The point of the knife is to enter the cornea, on the side next the lesser angle of the orbit, a little above its transverse diameter, and immediately anterior to its connection with the sclerotica. Thus introduced, it is to be pushed on slowly, but steadily, without the least intermission, and in a strait direction, with its blade parallel to the iris, so as to pierce the cornea towards the inner angle of the eye, on the side opposite to that which it first entered, and till about one third part of it is seen to emerge beyond the inner margin of the cornea. When the knife has reached so far, the punctuation, or that part of the operation which is preparatory to the section of the cornea, is completed. The broad part of the blade is now between the cornea and iris, and its cutting edge below the pupil, which, of consequence, is out of all danger of being wounded by it. As every degree of pressure must now be taken off the globe of the eye, the fingers, both of the operator and his assistant, are instantly to be removed from this part, and shifted to the eyelids. These are to be kept asunder by gently pressing them against the edges of the orbit; and the eye is to be left entirely to the guidance of the knife, by which it may be raised, depressed, or drawn on either side, as shall be found necessary. The aqueous humour being now partly, if not entirely, evacuated, and the cornea, of course, rendered flaccid, the edge of the blade is to be pressed slowly downward, till it has
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it is to be dipped into this aperture, by a slight motion of the hand forward, in order to puncture the capsule of the crystalline*; and then, by another slight motion, contrary to the former, it must be withdrawn from the pupil, and, passing through the anterior chamber, must be brought out near the inferior part of the cornea, a little inclined to the inner angle, and at the same distance from the sclerotica, as when it pierced the cornea above. If the knife has been well-directed, and the fore and middle fingers of the hand opposite to that which holds the instrument, have been properly applied, the section of the cornea,

cut its way out, and separated a little more than half the cornea from the sclerotica, following the semi-circular direction marked out by the attachment of the one to the other. And this completes the incision of the cornea.

* The Translator is of opinion, that this process of puncturing the capsule with the same instrument that is used for dividing the cornea, and at the same time, is rather a work of dexterity than usefulness; and, as it is often attended with much hazard of wounding the iris, he has not hitherto thought it adviseable to adopt it.

thus

thus completed, will be found sufficiently large; its shape will be semi-circular; and it will be quite near enough to the margin of the sclerotica.

When the cornea is divided very close to the sclerotica, it not unfrequently happens, that a drop or two of blood escapes. This ought not to occasion alarm or uneasiness, since it generally proceeds from some of the blood-vessels of the conjunctiva, which lie close to the border of the cornea, and are divided at the same time with this coat. Such a slight local bleeding, far from doing harm, may prove very advantageous; and, for my own part, I am so fully persuaded of its use, that I always designedly make the incision of the cornea as near as possible to the sclerotica, on purpose to divide and unload these vessels. The discharge from them, though small, has a tendency to prevent an inflammation in the eye after the operation.

If the upper edge of the orbit be very prominent, and the eye small, and sunk
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deep in this cavity, it may be difficult for the operator to make the incision through the cornea so perpendicular as I have above recommended. Was he to attempt to introduce the knife in this direction, the prominence of the bone would oblige him to give the instrument a direction so oblique with respect to the plane of the iris, that it would be impossible for him to continue it onward, and to make the incision through the cornea sufficiently large. In this case, the knife must be held less perpendicularly; but, even here, it ought not to be passed in an horizontal direction.

In the eyes of some persons, the iris is convex. The anterior chamber, in such cases, is considerably diminished; and it becomes so much the more difficult properly to complete the section of the cornea. It is indeed almost impossible to give it its due extent, without entangling the iris under the edge of the knife. Nor can the operator avoid wounding this membrane,

brane, unless he employs the frictions on the cornea, which I have so repeatedly recommended in this treatise, to disengage it. This convexity of the iris occurs most commonly in those cases where the crystalline assumes the form of an hydatid; but I have had occasion to remark the same circumstance, though the instances of it are very rare, where the crystalline has been in its natural state in point of size, and very nearly so in regard to transparency. I have also sometimes observed the same convexity in the iris, after the extraction of the opaque lens. In the greater number of instances, however, the iris is plain. Vesalius appears to have been the first who made this remark; and the fact has been fully confirmed by M. Petit, in the Memoirs of the Royal Academy for the years 1723, and 1728. Previous to the time of Vesalius, all anatomists, from Galen downward, supposed the iris to be naturally convex.

The noise that is sometimes heard when the cornea is divided, and the difficulty

that is experienced in making a section through this coat, have given occasion to persons who are little accustomed to perform this operation, to accuse the instrument they employ, and to suspect that its edge was not sufficiently keen. But this is wrong; for the cornea is sometimes so hard and tough, that the sharpest instrument cannot divide it without great difficulty. And the resistance I have frequently met with in cutting through this coat has been so great, that I have been struck with the propriety of calling it *cornea*, from the near resemblance which, in point of toughness, it bears to horn. When it is found thus difficult to divide the cornea, it would be extremely improper to use force in pushing the instrument through it; and it is of equal importance to remember, that the practice of drawing the knife backward and forward, should be carefully avoided; since, by this method, there would be danger of finishing the section imperfectly, and making it too small. The instrument, on the contrary, should be steadily, but gently, pushed forwards in the direction
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that was at first given to it; and the nails of the fore and middle-fingers may here prove useful, by supplying a resisting substance, on which the incision may be finished without a shock *.

When the capsule of the crystalline humour is divided by the same process with which the section is made through the cornea, the incision forms a flap, which resembles that of the cornea, but upon a smaller scale. This mode of dividing it is attended with many advantages. It is

* The cornea, which is composed of many lamina, placed one over the other, may be completely separated from the margin of the sclerotica which surrounds it. On this account, some anatomists have been of opinion, that the cornea is only contiguous to the sclerotica, and not a continuation of it. When in a healthy state, it seems to be endowed with very little sensibility; but it becomes highly sensible when wounded with a sharp instrument, and much more so when punctured with one that is sharp pointed. Perhaps this sensibility of the cornea is chiefly owing to the conjunctiva that covers it; but whether it be the cornea or conjunctiva that is thus endowed with sensibility, in either case it must be evident that an injury to this membrane is far from being a matter of indifference.

more expeditious, performing that at once, which, according to other methods, requires two or three repeated efforts; and it fatigues the eye less, and is therefore less liable to bring on accidents after the operation. In fact, the eye is an organ so extremely delicate, that when it is much irritated, or suffers much pain, it is always in a state of danger; and when, notwithstanding these impediments to a cure, an operation proves successful, the success can only be attributed to the singularly happy constitution of the patient.

But the incision of the cornea is not the most difficult part of the operation. It afterwards requires much dexterity, as well as judgment, successfully to extract the cataract; and this dexterity is particularly necessary when the opacity of the crystalline is complicated with other morbid alterations in the state of the eye.

If the section of the cornea be made in the oblique manner I have above recommended, not only many inconveniences will be avoided, but many advantages will

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often

often be obtained.—In the first place, the operator will escape the danger of unnecessarily wounding the adjacent parts, such as the caruncula lachrymalis, the angular vein, the nose, and the tunica-conjunctiva. These accidents are very likely to happen when the incision is made horizontally; that is, in a line with the great and small angles of the eye; and more especially in those cases where the eye is drawn inward, which is frequently the case, when the patient is much agitated.—In the next place, by this mode of making the section through the cornea, the operator will prevent the too hasty effusion of the aqueous humour. This is an important point, since, whenever it happens, the iris, getting before the edge of the knife, is in danger of enveloping it; and in this case, unless the mode of liberating it which I have indicated, by gently rubbing the cornea, be adopted, it is almost impossible to avoid wounding this membrane*.—Again, by this mode of operating,

* The premature effusion of the aqueous humour during the

rating, the incision of the cornea may be made larger than by any other, and the passage of the crystalline through the incision being hereby facilitated, the irritation, which a difficulty in extracting it might occasion, will be avoided.—But another, and one of the greatest advantages arising from this oblique mode of making the

the punctation of the cornea is so dangerous an accident, that no means, which have any tendency to prevent it, should be neglected. The Translator, however, is not certain that the oblique introduction of the knife will make any difference in this respect. The due retention of the aqueous humour in the eye appears to him to depend principally, if not entirely, first, on the goodness of the knife, which, like a wedge, should accurately increase in breadth and thickness all the way from the point to the handle; and, secondly, on the steadiness with which it is passed from one side of the cornea to the other. If, notwithstanding an attention to these circumstances, such an accident prematurely takes place, (that is, before the cutting edge of the knife has passed below the lower margin of the pupil) and, in consequence of it, the iris becomes entangled by the edge of the instrument, it may often be readily disengaged in the manner our author recommends, by gently rubbing the cornea downward with the point of the finger; and this the Translator believes to be one of the most important directions in the Baron's whole book.

incision

incision through the cornea, is, that the wound will afterwards be nearly covered by the upper eyelid; and its lips being thus kept in close contact, their re-union will be promoted, the cicatrix be made less apparent, and the danger of a staphyloma after the operation be diminished. When, on the contrary, the section of the cornea is made horizontally, if the upper lid becomes swelled, it will press against the superior part of the cornea, and retract or elevate the upper lip of the wound. And if, at the same time, the lower lid press the inferior lip of the wound inward, it will separate this lip still further from the superior, and often insinuate itself into the intermediate space. The air, also, getting between the lips of the wound, will dry them, render them callous, impede their re-union, and consequently deform the cicatrix, and produce a train of accidents, which too often terminate in a staphyloma.—The last advantage I shall mention, as arising from this oblique

lique mode of dividing the cornea, is, that the vitreous humour is less likely to escape through a wound thus made, than when the incision is made horizontally.

SECT.

S E C T. XIV.

*On a Mode of opening the Capsule,
necessary in some particular Cases.*

NOtwithstanding the advice I have given in the last section, to puncture the capsule of the crystalline humour with the same instrument, and at the same time that the incision is made through the cornea, yet this part of the operation cannot always be accomplished in this manner, without hazarding the sight, by keeping the instrument too long in the eye. In such cases, therefore, it is adviseable to pursue the incision of the cornea separately, and to leave the capsule to be opened afterwards, in the way I shall presently direct. By this method, the aqueous humour will be prevented from escaping too rapidly, and the iris from being entangled by the edge of the knife. My father's success, in the following case, must be attributed

attributed to his attention to this circumstance.

CASE XIII.

Madame Rood, who lived under the Exchange at Amsterdam, had been long afflicted with a cataract in the left eye; and, in the year 1761, my father extracted it, in presence of Messrs. Camper and Hovius, two celebrated Dutch physicians. The eye projected but little, the cornea was not very large, and the pupil possessed but a small degree of motion. The crystalline was very opaque, and the anterior part of its capsule was white, like a piece of paper, and adhered to the edge of the iris. As soon as the knife had pierced the cornea, and was dipped into the pupil, in order to divide the capsule, my father saw with surprize that the point of the instrument, although very sharp, instead of cutting through this membrane, slipped over it, as it would have done

done over tough leather. Under such a circumstance, it would have been dangerous to persist longer in the attempt to puncture it in this manner, because the aqueous humour would have escaped, and the iris would have entangled the knife. Though these accidents might not have been attended with any great inconvenience, it was certainly better to avoid them. Besides, the point of the instrument, in the different movements necessary to puncture the capsule, might have been hitched in the iris, and might unavoidably have wounded it. My father, therefore, withdrew the instrument from the capsule, and pursued the section of the cornea only; which, being finished, he afterwards not only divided but destroyed the anterior part of the capsule, with a needle contrived for this purpose, by moving it about in different directions. This part of the operation was both tedious and painful, on account of the toughness of the capsule, and its adherence to the iris. Being, at length, however, accomplished with the greatest care, which
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was indispensably necessary on account of its being opaque, the next object that called for attention was to extract the crystalline itself; but this did not give way to the gentle pressure that is usually found sufficient to dislodge it. Its upper edge repeatedly advanced in the pupil, and sometimes came almost through it; but its lower edge adhering to the posterior part of the capsule, and the capsule itself closely adhering to the membrane of the vitreous humour, it could not be made, without undue pressure, to advance any further. Every time the crystalline advanced, a small bladder was perceived on its posterior and inferior edge, strongly adherent to it, and formed by the hyaloid membrane*. My father, seeing this, signified to Messrs. Cam-

* By the hyaloid membrane is meant the tunic of the vitreous humour. This tunic is generally described as divisible into two parts; the external of which, properly speaking, is the tunica hyaloidæa; the internal, means a number of processes, or elongations, arising from the external, which pass in different directions through the humour, and form a series of cells, like those in a honeycomb, which serve to support this humour.

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per and Hovius, that a part of the vitreous humour would unavoidably escape. He then twisted the crystalline quite round, and thus destroying its adhesion, effected the complete extraction of it. The posterior part of the capsule was opaque, and came out adherent to the crystalline ; and, in the middle of this opaque part of the capsule, that fragment of the membrane of the vitreous humour was perceived, which formed the small bladder above described. Notwithstanding the upper lid was instantly closed, upon the extraction of the crystalline, there was a considerable effusion of the vitreous humour, as was foreseen. The lady suffered no pain afterwards, and though the operation was both intricate and tedious, it was followed neither by an inflammation nor staphyloma, and, in the usual time, the sight of this eye was perfectly restored.

C A S E XIV.

Mademoiselle Mariner, in la Ruë de la Verrerie, upon whom I operated in the
year

year 1784, presented an instance of the same toughness in the capsule, and the same resistance to the point of the instrument, in attempting to puncture it, as that which I have just described. The colour of the capsule, which was white and extremely vivid, the long continuance of the disorder, and, especially, the extreme agitation of the patient, determined me to postpone the attempt to puncture it, until I had finished the section of the cornea. It should be mentioned, that this lady had very prominent eyes, and her pupils were much contracted, though capable of a small change in size when exposed to different degrees of light. Having happily completed the section of each cornea, notwithstanding the difficulty of fixing the eyes, my next object was to divide the capsules. I began with that of the left eye; but having introduced a gold sharp-pointed needle for this purpose, and having worked it about in different directions, I could not cut through this membrane. I therefore relinquished the use of this in-

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strument,

strument, being afraid that the pressure I might make with it, though gentle, should lacerate the posterior part of the capsule, tear the hyaloid membrane, and plunge the crystalline deeper in the vitreous humour. Instead of the gold needle, I substituted a small sharp-pointed instrument, shaped like a hook, with the sharp end of which I hitched the anterior portion of the capsule, and, by gently moving the instrument about, detached it from its circumference. In this way, the anterior portion was brought away almost entire; which being accomplished, I proceeded to extract the cataract. The same phenomenon here presented itself, as in the preceding case. More than half the crystalline came through the pupil, but the remainder was kept back by an adhesion of its posterior and inferior part, upon which a small bladder was perceptible, formed by the hyaloid membrane. I several times compressed the eye, in order to dislodge the cataract; and, each time, almost the whole of it came through; but,

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in consequence of its attachment by the bladder above-mentioned, it always retreated again, as soon as the pressure was discontinued. I availed myself of my father's example in the former case, and intimated to a friend of the patient, who was present at the operation, that a part of the vitreous humour would unavoidably escape; after which I twisted the crystalline round on itself, when the bladder burst, and the cataract came out of the eye, bringing with it a portion of the vitreous humour. The quantity of this humour that escaped was, however, less than I expected, in consequence of the quickness with which the eyelids were closed, and a compress and bandage applied. These were continued on the left eye, whilst I proceeded to extract the cataract from the right. I did not attempt to divide the capsule of this eye with the gold needle; but, as soon as the section of the cornea was completed, I at once introduced the same small instrument, shaped like a hook, which I had employed in operating on the
left

left eye. With this I divided the capsule in different directions, and found it extremely tough. I could not remove it in one entire piece, as I had done in operating on the left eye, but I took it away in fragments, by means of a small forceps, before I attempted to extract the cataract. In extracting this body I found the same sort of adhesion to the hyaloid membrane as in the other eye, but less considerable; and so, likewise, was the effusion of the vitreous humour, which followed the cataract.

Having applied the proper dressings, the patient was put to bed, with her head in a very low position. Both her eyes were painful for some days, and particularly the left eye, which had principally suffered during the operation. She was repeatedly bled, and took many cooling and diluting medicines. When I opened the eyes at the usual time after the operation, she distinguished all objects tolerably well, but less perfectly with the left eye than with the right. Upon examination, I perceived a slight confusion both in the aqueous humour and in the cornea of the

former; and the iris had a pale green colour, which inclined me to fear that an hypopion would follow. To prevent this disease, I bled her in the foot, prescribed a very exact regimen, and applied a large blister. The use of these remedies was attended with success; the eye grew better and better every day; and after some months, notwithstanding the loss of the vitreous humour, and all the obstacles that intervened, the patient was able to read, with the assistance of proper glasses.

It sometimes happens, that the anterior portion of the capsule of the crystalline is opaque, as well as the crystalline itself. This kind of complicated cataract may be distinguished by the appearance of points or spots, whiter and larger on one part of the cataract than on another. These spots may, indeed, be perceived in the crystalline, when there is no disorder in the capsule; but then they lie deeper in the eye; whereas opacities in the capsule not only appear more forward, but seem as if they were detached from
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the cryſtalline; an opacity of which humour, when other parts of the eye are undiſeaſed, is, in general, uniformly white; and if the anterior part of the capſule is, at the ſame time, opaque, the opacity exactly covers or fills up the aperture of the pupil. In this caſe the following mode of operation is the moſt likely to prove ſucceſſful.

After having completed the ſection of the cornea, the anterior portion of the capſule is not to be divided in the manner I have recommended in common caſes. Inſtead of the inſtrument deſcribed above, a ſmall forceps * muſt be introduced through the pupil, and a portion of the capſule muſt be gently laid hold of with its extremities. The capſule is then to be regularly ſeparated, round the whole circumference, from the adheſions it may have formed with the parts which ſurround it; and, in this manner, may be taken out entire. This method has never been attended with any great inconveniences in thoſe caſes which have

* See the ſhape of this forceps in fig. 11.

fallen within the course of my practice. The anterior capsule being taken away, the crystalline itself is then to be extracted; but if this body were first to be removed, it would be extremely difficult afterwards to take away the opaque capsule, without lacerating the hyaloid membrane, and thus giving vent to the vitreous humour. Besides, there could in this case be no certainty of removing the anterior part of the capsule so perfectly, as that some portions of it should not remain behind, which would prove injurious to the sight. By the process above mentioned, the fore part of the capsule is the more easily removed, because the crystalline, while it remains in the eye, serves as a support, by means of which the capsule is more effectually seized; and because there is, in this case, no danger of tearing the membrane of the vitreous humour, to which some fragments of the capsule will unavoidably adhere, when the crystalline is first extracted.

CASE

CASE XV.

Monf. de Montgirod, a merchant, of Lyons, came to Paris in the year 1784, and, soon after his arrival, consulted me on account of two cataracts. That of the right eye was complete, and moreover discovered symptoms of an opacity in the anterior portion of its capsule. The left eye did not seem to be affected with the same kind of complex disease. The patient having determined to submit to the operation on both eyes, I began with the left eye, in which the crystalline alone appeared to be opaque. I made the incision of the capsule at the same time with that of the cornea; and then, instead of immediately extracting the crystalline, I proceeded to operate upon the other eye *, the cornea
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* When the right and left eyes are to be operated upon at the same time, we always make the section of both corneas before we terminate the operation in

of which I divided by itself, that I might be able afterwards to take out the capsule entire, in the manner I have recommended in this section. I then extracted the cataract from the left eye; after which, perceiving, contrary to my expectation, that some portions of this capsule, which I had divided with the cornea, were manifestly opaque, I was obliged to introduce the forceps, and extract them one after the other. I found great difficulty in doing this, and was much afraid, least, in accomplishing it, I should divide the hyaloid membrane, to which some of these portions adhered; and, notwithstanding all my care and precaution, a small quantity of the

either; which practice we have found to succeed better than that of finishing the extraction of one cataract, before the operation is begun on the other. In this way the patient is always more firm and tranquil. Whereas, on the contrary, when he is permitted to see objects with one eye before the operation is begun in the other eye, his spirits are always much agitated, he becomes less tractable; and though care be taken to bind up the eye that has been operated upon, yet both eyes become highly irritable, in consequence of the sympathy that subsists between them.

vitreous

vitreous humour escaped during this difficult operation. When it was finished, however, the patient saw tolerably well, though the pupil was unavoidably a little deformed. The right eye gave me much less trouble, because I was prepared for what might happen. The fore part of the capsule being undivided, and receiving support from the crystalline behind it, I was able more readily to lay hold of it with the forceps, and, by gently moving it in various directions, I detached it round its circumference, and immediately extracted it. The crystalline afterwards came through without any difficulty, and the operation was soon happily terminated. The patient suffered pain only in the left eye; and this was occasioned, without doubt, by the slight efforts I was obliged to make with the forceps, in order to bring away the opaque capsule. But notwithstanding this, upon his return to Lyons, he enjoyed almost as good a sight in this eye as in the other, which underwent no pain whatever after the time of the operation.

CASE

CASE XVI.

Madame Harvey, a tobacconist, at Châlons sur Marne, presented a complicated case similar to the preceding. She had a cataract in the right eye, combined with an opacity in the anterior portion of the capsule, as appeared by the white spots and inequalities, of which I have spoken above, in the surface of the crystalline. Her left eye was sound. I operated on the right eye in the year 1782. After the section of the cornea was completed, I detached the anterior portion of the capsule with the forceps, and, without injury, took it away entire. The crystalline afterwards came out easily. The patient suffered some pain in consequence of the operation, but it was soon removed by bleeding her in the foot; and, notwithstanding this obstacle, the sight was soon recovered to as great a degree of perfection as was possible after such an operation.

In cases where the pupil is much contracted, as well as in those where the muscles of the eye and the eyelids are easily thrown into convulsions at the approach of an instrument, it is improper to puncture the capsule at the same time that the section is made through the cornea. This is likewise improper, where the space between the crystalline and the iris*, which is usually called the posterior chamber of the aqueous humour, appears to be large. In all such cases, it is more adviseable simply to divide the cornea in the first instance, and then to puncture the capsule with a different instrument; by which means the danger of wounding the iris with the cornea knife will be very much obviated.

* Though the space between the iris and the crystalline is sometimes considerable, it is, at other times, so small, that the opaque crystalline appears to touch the iris; and, no doubt, it was this circumstance that led Winslow, and some other celebrated anatomists, to doubt the existence of this posterior chamber of the aqueous humour. See Winslow's *Expos. Anatom.* p. 317. Paris, 1721; Senac. *Anat. d'Heister*, p. 693, &c. Paris, 1735. Lieutaud, *Essais Anatomiques*, p. 128, 131, &c.

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The instrument we employ in such cases, for the purpose of puncturing the capsule, is a flat needle, one line, that is one-twelfth part of an inch, in diameter, having its cutting extremity a little incurvated *. This needle, which should be made of nealed gold, that, being pliable, the operator may be able to bend it in different directions, as occasion requires, is fixed in a handle, two inches and a half in length, and similar to that of the cornea knife. At the other extremity of the same handle, a small curette or scoop is fixed, made also of nealed gold, which is of use to extract the cataract (see fig. 9.). The needle and curette being thus fixed in the same handle, may each of them be used according to the circumstances of the operation, without any further trouble or interruption, than merely turning the instrument in the hand.

* When the capsule is hard and tough, the flat needle here described is sometimes found insufficient to pierce and destroy it; and in such cases there is a necessity to substitute in its place a sharper instrument, but shaped nearly in a similar manner. See fig. 10.

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The flat needle is also of great use to dilate the pupil, in cases where this aperture is too much contracted, and the crystalline very bulky. Its sides being blunt, it may be introduced through the pupil, without any danger of wounding the iris; and in this and other respects it is much superior to the *cystitome* of La Faye. But the dilatation of the pupil, which this instrument is capable of producing, is not always sufficient to answer the purpose; and when the pupil has been much contracted, I have sometimes been obliged to enlarge its aperture, by dividing the iris with a pair of scissors. This operation is less dangerous than the extension of the fibres of the iris, occasioned by a very large crystalline passing through it.—The following cases are adduced in proof of this assertion.

C A S E

CASE XVII.

In the year 1783, a woman was brought to me, from Fontenay sur Bois, who had a complete cataract in the left eye, and an incipient one in the right. On examining her eyes, I found that the pupils dilated and contracted very feebly, and were so much reduced in size, that they could scarcely admit the head of a pin *. These circumstances rendered it impossible to puncture the capsule at the same time that the section was made through the cornea. I therefore divided the cornea in the first place; and, afterwards, according to the process I have already stated, introduced the flat needle, just now described, into the pupil; and there, moving it in different directions, I not only punctured the cap-

* It might be imagined, that this contraction of the pupil would render it very difficult to discover an opacity in the crystalline humour. But I can assure the reader, that, with very little attention, the alteration in the structure either of this body, or of its capsule, may easily be perceived.

fule,

sule, but dilated the pupil both upward and downward, and to the right side and left. Then, by a slight pressure on the upper part of the globe of the eye, I brought the upper edge of the crystalline to shew itself through the pupil; but this aperture was so much contracted, that it afterwards required a considerable time to enlarge it as much as was necessary, in order to make room for the crystalline to pass through it. At last, when about a quarter-part of it had made its way through the pupil, as it did not readily advance further, I was obliged to disengage it from the iris by means of the curette, with which I turned the crystalline quite round on itself, and then extracted it.

From this case, we may collect how essential it always is to make a large incision through the cornea, in order to give the pupil sufficient room to dilate with ease. There is no reason, under these circumstances, to apprehend a staphyloma, as has been supposed by some authors. I have observed, on the contrary, that

that the wound has healed with less difficulty, and staphylomas have been less frequent, when the section of the cornea has been thus large, than when it has been small; and, if the section be made in the oblique manner I have above directed, it will be completely covered by the upper lid; so that a hernia of the iris cannot take place in consequence of it, nor can the edge of the lower lid easily insinuate itself between the lips of the wound, so as to prevent their union*; which accidents it is very difficult to avoid, when the incision is made horizontally.

The woman, in the case just stated, was cured in a very few days. The pupil continued but little more dilated after the ope-

* The failure of the operation of extracting the cataract, is often owing to the smallness of the incision made through the cornea. The obstacles the crystalline meets with in coming through this aperture, produce inflammation, suppuration in the eye, pain, opacity in the cornea, and many other accidents, which would happen less frequently, even if a wound were made through the iris.

ration,

ration than it did before, and its power of motion was increased but in a very small degree. The sight of this eye was, however, as good as I had any reason to think it could be after such an operation. The following year, I performed a like operation upon the other eye, and under very much the same circumstances.

C A S E XVIII.

In the year 1768, my father being in London, Mrs. Pitt brought to him a lady who lived with her as a companion, and who had a cataract in each eye. After a careful examination, he was of opinion, that the capsules of both crystallines were opaque, and adhered to the iris. These circumstances were so unfavourable, that he gave the lady no encouragement to expect relief from the operation; and indeed was not prevailed upon to undertake it without the most earnest solicitation. He then desired that some persons might be present, who

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were

were able to judge of the critical nature of the case. Messrs. Sharp and Gataker, surgeons to the Royal Family, were accordingly proposed by Mrs. Pitt; and in their presence the operation was performed. After having divided the cornea of both eyes in the usual manner, my father introduced the gold needle, to puncture the capsules of the crystallines; which part of the operation he dared not attempt with the cornea knife, on account of the contraction of the pupils. With this needle he enlarged the pupils, and separated the adhesion between the capsules and the iris; after which, by gently pressing on the upper part of the globe, the crystallines came through, and with them their anterior capsules, which were opaque, and adherent to them, and had been very slightly, if at all, wounded by the needle. The iris, which protruded through the wound in the cornea, as the cataract came out; was pushed back, and replaced, by means of the curette. As soon as the operation was finished, the lady perceiv-

ed distinctly every thing that was placed before her; and, after a short time, was perfectly cured, without suffering any inconvenience either from pain or inflammation. The pupils remained still immovable; but they were nearly round in figure, and not so much contracted as before the extraction of the cataracts.

This operation was attended with a degree of success much beyond what might have been expected from the state of the patient. In describing it, I have particularly noticed the protrusion of the iris through the aperture in the cornea, after the cataract was extracted. This accident, which might in all probability have been the cause of a staphyloma, is not unfrequent, when the iris is relaxed, and the pupil much stretched by the passage of a large crystalline through it. I shall have occasion to speak of it again in another part of this treatise.

S E C T. XV.

Upon the Section of the Cornea.

IN making the section through the cornea, the fore and middle fingers of the hand opposite to that which holds the knife, are found highly useful to render the incision round, and to give it its proper extent and direction. The nail often affords a necessary support to the edge of the instrument, directing it downward and outward, after its point is come through the inner side of the cornea. See fig. 5. From hence, therefore, it may be conceived to be of the utmost consequence that these fingers should not be embarrassed by any instrument. And when the incision is begun, it should be steadily pursued through the cornea, without turning the edge of the knife forward or downward, as inexperienced operators are sometimes apt to think necessary,

necessary, in order to finish the section more speedily.

It is also a matter of importance, that the knife be held lightly between the fingers, and that no violent efforts be used in making the incision.

If, in consequence of the operator's inattention, the edge of the knife inclines too much forwards, and its direction be not changed, the incision through the cornea will be made too small, and will terminate almost opposite to the pupil. In this case, there will be great difficulty in extracting the cataract * ; and afterwards the cicatrix will

* The Translator has, more than once, seen operators embarrassed in consequence of their inattention to this circumstance. Under an apprehension of wounding the iris, they have introduced and brought out the instrument at a considerable distance anterior to the line of union between the cornea and sclerotica ; in consequence of which, the incision from one side of the cornea to the other has been made too small to allow the easy extraction of the cataract, although, from above, downward, it was fully competent to answer this purpose. The Translator has also sometimes seen, that though the punctuation of the cornea, from side to side, has been properly conducted, and its section, afterwards, to all appearance, effectually com-

will often prove an impediment to the patient's sight. If, on the contrary, the edge of the instrument be inclined too much backward, and its direction remain unaltered, the incision will approach too near the part where the iris and sclerotica unite, and there will be great danger of wounding one or the other of these coats of the eye. Both these accidents are injurious, and may be prevented by gently rolling the instrument between the fingers, until its blade assumes its proper direction.

When the knife has pierced both sides of the cornea, though its point may have

pleted, yet, by reason of the frictions that were employed to disengage the iris from the edge of the instrument, the knife, in cutting its way downward, has been carried between the lamina of the cornea, and, consequently, though the incision has appeared externally to be of its proper size, internally it has been much too small, which has, therefore, occasioned the operator much trouble in bringing the cataract through it. When this is known to be the cause of the difficulty, the remedy is manifest. The incision must be enlarged; and this will be most effectually done by means of a pair of curved blunt-pointed scissors, which should be introduced on the outer side of the cornea, in the part where the point of the knife entered this tunic.

passed

passed through on the side of the great angle, for the space only of half a line, yet the eye is hereby fixed; and if it should afterwards incline further toward the great angle, it may easily be brought back, and the incision be finished in the manner I have above directed.

Though it is very desirable, in every instance, to make a large incision through the cornea, and, as much as possible, to prevent the wound from lying opposite to the pupil, yet cases sometimes occur, in which it is not easy to accomplish this design, either on account of the largeness, or of the flaccidity of this tunic. Under these circumstances, though the knife, even in the broadest part of it, be carried through the cornea, yet, a considerable part of this tunic will still remain undivided. I have known this to be the case, especially in those instances where the patient has been very timid, and has borne the operation impatiently. To prevent such an inconvenience, the operator should always have in readiness knives of a different breadth; and,

before he begins an operation, he should compare them, as nearly as possible, with the dimensions of the cornea, taking care that they be wide enough in the diameter of the blade to complete the section of this tunic, and to make it as large as may be necessary. If, however, this precaution has not been attended to, and if, when the instrument has passed through the cornea to its broadest part, there still remains a portion of this coat to be divided, the defect must be remedied, and the incision carried on, by withdrawing the knife on the side towards the small angle of the orbit of the eye, and, at the same time, gently lowering or pressing down the point of it. By this process, the incision will be enlarged and completed, the instrument will be brought out, as nearly as possible, to the lower margin of the cornea, and the roundness of the section be preserved. See the shape of it in fig. 6. The assistant, to whose care the upper lid is entrusted, is gradually to let it drop, after the knife has pierced through the cornea, and

as it cuts its way downward, in order to prevent the cataract from escaping too hastily; and then the whole charge of the eye devolves solely on the operator, who is to solicit the extraction of the cataract by gentle pressure on the upper part of the globe.

When the crystalline, thus dislodged from its capsule, protrudes itself through the aperture in the cornea, its removal from the eye may sometimes be assisted by the use of the needle above described; and, afterwards, the opaque and glutinous matter, which frequently accompanies the cataract, and is produced by the dissolution of a part of its substance, must be removed with the greatest care, by means of the curette.

It is always adviseable, after the operation, gently to rub the anterior part of the cornea, over the lids, either with the thumb or the curette. This process usually collects in the center of the pupil some small fragments of opaque matter, which the crystalline leaves behind it; and which,
if

if not taken away with the curette, might escape notice, and give rise to a particular kind of secondary cataract, which I shall describe more fully in a future section.

The curette is of use, also, to replace the iris; some portion of which membrane occasionally comes through the incision in the cornea, and especially after the extraction of a large cataract. The deformity in the figure of the pupil, which the inclosure of a part of the iris in the cicatrix of the cornea unavoidably produces, will hereby be prevented,

S E C T. XVI.

Upon the Extraction of the Adherent Cataract.

IT happens, not unfrequently, in cataracts which have been long formed, that the crystalline does not readily escape through the section of the cornea; not yielding to the gentle pressure recommended in the last section. In such cases, the adhesions that retain it, and obstruct its passage, must be separated by means of the golden needle above recommended; which is to be introduced under the cornea, and applied in different directions, according as the case requires, and, more especially, round the circumference of the crystalline. This method we have always practised with success; and I think it my duty to establish it, as far as I am able, by stating some very remarkable cases.

C A S E

C A S E X I X.

M. Monigny, well known for his musical talents, had a cataract in the right eye, the pupil of which was almost motionless. In the year 1784 my father operated on this eye, in presence of M. Imbert, surgeon to the Duke de Chartres. After the cornea and capsule had been properly divided, my father found that the cataract did not come through the wound on his making the usual pressure. He was therefore obliged to introduce the needle, and to carry it in different directions round the crystalline, in order to destroy the adhesions it had formed to the posterior part of the iris. This part of the operation took up at least fifteen minutes. After which the crystalline came out, but slowly, and with some difficulty; bringing with it, a part of the anterior capsule, on which were several dark-coloured streaks. These were produced by vessels that were detached from

from the posterior surface of the iris, and which remained still adherent to it.

Notwithstanding the length of the operation, and the fatigue which the eye necessarily underwent, the patient experienced no further accident than an acute pain in the eye, which was soon mitigated by bleeding in the foot. His sight became as good as it usually is, after the most favourable operation, and the pupil returned to its natural state.

C A S E XX.

M. Richer, an old officer in the *Chambre des Comptes*, had had a cataract in each eye for many years; and, in the year 1785, submitted to the operation. The cataract in the right eye had been formed some time before the other; and both were in a continued convulsive motion, which rendered it very difficult properly to make the section of the cornea. This was, however, at length completed with perfect safety, but
without

without attempting, till afterwards, to puncture the capsule. The iris in each eye came forwards, and entirely enveloped the knife, but was disengaged from it by gently rubbing the anterior part of the cornea with the finger. The chief difficulty occurred in introducing the needle to puncture the capsule; and this arose from the perpetual motion of the eye, which rendered it still more embarrassing to destroy the adhesions of the right cataract. This was a case that required a patient and steady perseverance. It might be supposed by some, that a speculum oculi would here have been of use; but, under the present circumstances, more than others, I am of opinion this instrument would have been detrimental, as it would have increased the irritation of the eye, and, by its undue pressure, would, probably, have forced out the vitreous humour. At last, after many attempts, the capsules of both eyes were divided, and their adhesions destroyed. The cataracts came out slowly, and brought with them a part of their anterior

terior capsules; on the circumferences of which several black streaks appeared, which were the terminations of some of the ciliary processes adherent to it; a circumstance which occasionally takes place, when the eye is in a diseased state. Upon the crystalline of the right eye they were perceived at regular distances, parallel to one another, and extending nearly to its most convex part. As the adhesion in this eye was most considerable, and the motion of the pupil most confined, it appeared to us more than probable that these streaks, were vascular fibres, separated from the posterior surface of the iris, to which it was evident, the capsule which came away with the crystalline also adhered *.

Notwithstanding

* The circumstances of this case, which is not an uncommon one, may be thought to give weight to the opinion of those anatomists, who believe the ciliary processes to be inserted into the capsule of the crystalline humour. But, since these black filaments are observed only when the eye is in a diseased state; and since the most celebrated anatomists have never been able to discover their insertion in this manner in a healthy eye, and deny their supposed use, in bringing the crystalline
nearer

Notwithstanding the complications above described, and the various difficulties which unavoidably protracted the operation to a tedious length, the patient recovered his sight; nor did he suffer any degree of inflammation, nor, which is still more remarkable, any pain.

C A S E X X I.

M. Cleret, an old comptroller of the King's household, upon whom I operated in presence of my colleague, M. Mathey, presented another case of these rare complications in both eyes. The cataract in

nearer to the pupil, or carrying it further from it, according as the object is at a greater or a smaller distance from the eye, is it not more probable that the union of these parts, whenever it takes place, is the effect of disease, and that, in their natural state, they are always separate? Consult, on this subject, Haller, Heister, Camper, Cassebohm, Zinn, M. Sabatier, &c. who are of the latter opinion; and Morgagny, Bidloo, Porterfield, Jurin, Smith, &c. who think, on the contrary, that the ciliary processes are thus attached to the crystalline capsule, and destined to the use suggested above.

the

the left eye was of more than twelve years continuance; that in the right was more recent. Both eyes were extremely irritable, and habitually watery, and the eyelids were swelled, and slightly œdematous. But, notwithstanding these disagreeable circumstances, together with an adhesion of the crystalline, which I also suspected, the eyes appeared to be in a state which afforded hopes of success from an operation. I therefore undertook it. The agitation in which I found the patient, and the continual and almost convulsive motion of the eyes, determined me to make the section of the cornea only in the first incision. This process was speedily accomplished; yet, before it was finished in both eyes, the patient became sick, and I did not attempt to proceed until he was perfectly recovered*.

After

* Some persons have a disposition to vomit, either when they go into a fainting fit, or when they recover from it. When, therefore, a patient faints during the operation, it is always adviseable to wait until he be quite recovered, before the operation is pursued. This may

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prevent

After the short delay which this circumstance occasioned, I divided the capsules of the crystalline with the needle; after which, as the cataracts did not come through upon my applying the usual gentle pressure with my finger on the upper part of the globe of the eye, and with the curette on the lower, I was confirmed in my opinion that the crystallines adhered. I therefore destroyed these adhesions with the needle, and afterwards extracted the cataracts. They came through with some

prevent a derangement of the interior parts of the eye, and a consequent extravasation of the vitreous humour; which accidents are not so likely to happen whilst the crystalline remains in its place, because this serves as a kind of support to the other parts of the eye. The dangerous effects produced by vomiting under the operation I have frequently seen exemplified; and, in particular, in the case of a woman who was attacked in this manner immediately after I had extracted a cataract from one of her eyes. I was obliged to wait till she came to herself before I proceeded to extract the other lens; and, notwithstanding I had equal reason to hope for success in both eyes, I succeeded only with the last; the violence of reaching having caused, in the first eye, an extravasation of the vitreous humour, and, in consequence of this, a total loss of sight.

difficulty;

difficulty; and round their circumference some black vessels appeared, similar to those I have described in the two last cases. The number of these was most considerable on the lower part of the rim of the crystalline, in the left eye, in which the disease had prevailed for the greatest length of time; and this crystalline, together with a part of the capsule that adhered to it, came out, in a manner that is not usual, with its upper edge foremost. I afterwards removed some loose portions of the crystalline which remained in the pupil, and, when satisfied that they were all taken away, I bound up the eyes in the usual manner, with a compress and bandage.

The day after the operation, perceiving that the eyelids were swollen, I took away the compresses, and left only the bandage tied loosely over the eyes. I had no apprehensions lest the patient should open his eyes; because, on account of the swelling of the lids, he could not do it without much difficulty. On the third day, I removed the bandage also, and left the eyes

quite at liberty, only giving directions that the window shutters of the patient's room should be kept close shut. This method happily succeeded. The action of the air on the lids caused the swelling to subside; and, in five days after the operation, I opened the eyes, and the patient saw objects distinctly. He was cured in a short time without experiencing either pain, inflammation, or a staphyloma, consequences which I had reason to apprehend from the complications of the disorder and the difficulties of the operation; and which, in all probability, would have taken place under any other mode of treatment, and without the precautions which I have pointed out.

From a consideration of this case, we perceive the manifest absurdity of the vulgar notion, in regard to the *maturity* of a cataract. The longer a cataract remains, the more difficult will always be the operation, and the more uncertain its success.

SECT.

S E C T. XVII.

*Upon the Extraction of the Opaque
Crystalline, when the Vitreous
Humour is diseased.*

IT sometimes happens, when the capsule of the crystalline is destroyed, and the crystalline itself perfectly free, that this humour plunges to the inferior part of the vitreous humour, almost to the bottom of the eye, leaving only its upper edge visible through the pupil.

In this case, the hyaloid membrane of the vitreous humour is also most commonly destroyed, and the vitreous humour itself in a state of fluidity. All pressure, therefore, on the ball of the eye, must be carefully avoided, since this would produce a large evacuation of the vitreous humour. The only method that can be pursued is to introduce through the pupil a small steel hook, (see fig. X.) to take

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hold

hold of the crystalline, which, under such circumstances, I have often found very small, and with this instrument to disengage it from the bottom of the eye, and so to extract it. As soon as ever the crystalline is taken out, the eyelids must be instantly closed, in order to retain the vitreous humour; which, without this precaution, would freely and immediately follow the crystalline. I shall now relate two cases, in which the adhesion of the crystalline, and the soft and fluid state of the vitreous humour, rendered the extraction of the cataract extremely difficult, and the directions I have given very necessary to be observed.

CASE XXII.

A poor woman, *de la Ferté sous Jouarre*, who had a cataract in the right eye upwards of ten years, came to consult me in the year 1780. I found all the symptoms of the case favourable to an operation; and

and the patient gladly submitting to it, I went about it in the following manner. Having first covered the left eye, I divided the cornea of the right eye with the knife I usually employ; and as the instrument passed through, I dipped its point into the pupil, to puncture the anterior portion of the capsule. I then enlarged, with the gold needle, the wound that was thus made in the capsule, and endeavoured, with the usual pressure, to bring the cataract through it. As it did not yield to this, I at first suspected that the capsule was not sufficiently opened; I therefore introduced the needle a second time, in order to enlarge the orifice; but, after this process, the cataract, instead of coming through the pupil, sunk toward the bottom of the eye, and every time I made the slightest pressure, the vitreous humour presented itself before the opening in the cornea; and the crystalline, in consequence of the liberty it had acquired by the destruction of the posterior capsule, hid itself still deeper in the eye. I now relinquished

the use of the needle, and introduced a small hook; with which, after several efforts, I laid hold of the crystalline; and, having fixed it on the point of the hook, I extracted it by gently withdrawing this instrument, taking particular care, at the same time, whilst the crystalline was passing through the orifice in the cornea, to drop the upper lid, in order to preserve the vitreous humour. I did not afterwards suffer the patient to indulge her curiosity, by looking about and enjoying the light; because this, however pleasant, and even useful, it might have been in other cases, would, in the present instance, have been prejudicial *. I immediately bound up,

not

* It may sometimes be of use to allow the patient to look about him after the operation, because, by this means, the operator may be apprized of certain mucous particles in the eye, which intercept or weaken the sight; although at first, perhaps, they were scarcely perceptible. It would, however, be dangerous to use the eye for any length of time, or without proper precaution. The following example affords a striking proof of this assertion, although it was not attended

not only the eye that had undergone the operation, but the sound one also; a precaution

tended with those disagreeable consequences which might naturally have been apprehended.

I performed the operation on a woman who had a cataract in the right eye; the sight of the left having been lost many years, in consequence of a blow she then received. The operation terminated speedily and happily; after which, I turned the patient's back to the window, in which situation she perceived all objects before her distinctly. Being satisfied that nothing improper now remained in the eye, I was desirous of binding it up; but the patient, anxious to look at her husband, whom she had not seen for a long time, opened the eye again; when, either from too great an effort, or from a natural convulsive disposition in the eye, which, however, had not discovered itself during the operation, a portion of the vitreous humour, in shape like a small globe, slipped out, which, notwithstanding all my care quickly to close the eye, and to cover it with a compress and bandage, was followed by another portion of the same humour in a more fluid state. The loss of this humour, as nearly as I could judge, was equal to three-fourths of its whole quantity; and though I had often seen considerable portions of it discharged, without destroying the sight, yet in this case, the quantity that escaped was so considerable, that I could not refrain from giving up the eye as entirely lost.

The patient suffered no pain after the operation, and, at the end of three days, I opened the eye; when, to my

caution which it is necessary to use after all operations on the eye, even the most simple; it being almost impossible that one eye should not follow the motions of the other. I ordered the patient to be put to bed, and recommended to her to lay her head low, and to move it as little as possible, in order to prevent the escape of the vitreous humour. In a fortnight she was perfectly cured; and though the pupil remained larger than it was before the operation, or than that of the left eye, and had much less motion, yet this eye,

my great surprize, she distinguished every object she looked at, with a clearness, which, considering the accident, was almost incredible. The eye was much reduced in size, and the pupil so much dilated, that if she had not clearly perceived every thing I shewed her, even so as to distinguish the hour on a dial-plate of a small watch, I should have supposed it affected by a complete gutta serena. I have before mentioned, that the dilatation of the pupil is almost always beneficial after the extraction of the cataract. The patient, whose case I have now stated, affords a proof of this observation; having since enjoyed as good a sight as is ever experienced after the most successful operation.

as well as the other, perceived objects very distinctly.

CASE XXIII.

M. de Pradine, who is well known in Grenada, arrived in London in the year 1783, in order to have two cataracts extracted, which were of nine years continuance. The pupils were somewhat contracted, and the anterior and posterior portions of the capsule were not only opaque, but as tough as leather, and adherent to the crystallines. The operation was performed by my father. When the section of the cornea was finished, and my father attempted to puncture the capsule, he was unable to accomplish his purpose, and the crystalline plunged to the bottom of the vitreous humour, which was quite fluid, and the hyaloid membrane of which was totally destroyed. The needle having been found insufficient to puncture the capsule, it was much less able to seize it,
and

and bring it away. A small hook was therefore substituted in the room of it, the extremity of which, being much bent, succeeded at length in taking hold of it, and raising it, flabby as it was, from the bottom of the eye. The fluid state of the vitreous humour presented difficulties that were almost insurmountable. No one part of the eye could afford any support; the crystalline fled from the instrument as soon as it was touched, and the vitreous humour oozed out insensibly, notwithstanding the most scrupulous care to prevent it. In order to fix the crystalline, it was necessary to make an artificial support for it, with the fore-finger of the hand which was at liberty. The operation lasted upwards of three quarters of an hour; and notwithstanding the loss of a very considerable portion of the vitreous humour, and the fatigue which the different parts of the eye necessarily underwent from the long and repeated manœuvres I have just described, the patient, immediately after the extraction, and before the eye was

bound up, perceived distinctly the squares of the window opposite to which he was placed. The crystalline being seized, and, as it were, harpooned, by the small hook, was very large, and almost black; and it brought away with it its two capsules, which were white and adherent to its surface. The appearance of the cataract, as seen through the cornea, was owing to the colour and opacity of the anterior portion of the capsule.

All these unfortunate circumstances did not prevent the patient from being perfectly cured. He neither suffered from pain, inflammation, nor a staphyloma; and it may appear very extraordinary when I add, that his sight was afterwards as good as it usually is after the extraction of the cataract*. The pupil, however, remained much dilated, and slightly irregular.

* The operation, in this instance, proved singularly fortunate. But, the Translator is of opinion, that it ought not to encourage a sanguine hope of success in similar cases.

Both

Both eyes presented nearly the same difficulties in the operation; and yet the same success attended both. And it may here be of use to remark, that when cataracts have been of long duration, they are very often complicated in the way I have described in this and the preceding cases.

It is certainly not easy to conceive how so great a loss of the vitreous humour, as that which happened in the preceding cases, could take place, without being followed with a total deprivation of sight. But it is an undoubted fact, proved by numberless well-authenticated cases, that the sight may be recovered, notwithstanding a very large effusion of it. It is the opinion of some authors, that this humour is regenerated. But is it not more probable, that the aqueous humour supplies the place of the vitreous? And, notwithstanding there is a considerable difference between these humours, in regard to the specific density of each, may not the latter,

latter, to a certain degree, perform the office of the former?

When the vitreous humour is undiseased, it never escapes during the operation, unless it be through some error or neglect of the operator. This humour is contained in a membrane, which is evidently double in that part which is situated behind the crystalline. One of its lamina is continued into the substance of the vitreous humour, and forms a number of small cells, which communicate with each other; whilst the other lamina covers the crystalline in such a way, that unless the pressure on the eye be both considerable and improper, it cannot be extravasated. But if the vitreous humour be diseased, the case is different, and it is very difficult to avoid the effusion of a part of it; and especially, if the operator be not aware of this complication of the case, before he has divided the cornea.

S E C T.

S E C T. XVIII.

Upon the Extraction of the Opaque Crystalline, when complicated with Varicous Vessels.

IT sometimes happens, that the cataract is accompanied with varicous vessels in the retina, and the choroides *; in which case, the operation occasions a considerable hæmorrhage, which, however, soon ceases of itself. The hæmorrhage usually comes on a few minutes after the operation, and whenever it takes place, it is natural to

* Though I here mention this complication of the cataract, yet the gutta serena which usually accompanies it, forbids the performance of any operation. Nevertheless, as professional men are often forced to yield to the urgent solicitations of patients, who have no glimpse of hope left, but what arises from the mere possibility of succeeding in the operation, it cannot be foreign to the design of this treatise, to state the accidents that are likely to ensue under such unfortunate circumstances.

conclude,

conclude, that the operation will be fruitless and ineffectual. This state of the eye may indeed be previously ascertained, upon an attentive examination. It is much harder than when it is undiseased; the cornea is small and conical; the pupil dilated and immoveable; and, upon enquiry, it will be found that a palsy of the nerve preceded the opacity of the crystalline, and that the patient has suffered considerable pain both at the bottom of the orbit, and in the parts surrounding the eye. The vessels of the sclerotica, also, are varicous, being readily perceived externally, and especially those that are near the angles of the eyelids.

An hæmorrhage, therefore, is not likely to take place, except in one of those unpleasant operations, which we are sometimes under the necessity of performing, contrary to our own judgment, and merely in compliance with the pressing solicitations of those patients, who, having only this remaining hope, are deaf to every reasonable objection.

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CASE

C A S E XXIV.

In the year 1760 my father was sent for to Pest, in Hungary, to see the Countess Crachalkowitz, whose husband was president of the council. This lady had a cataract in the right eye. The pupil was entirely motionless, and as much dilated as it usually is in cases of the gutta serena *. She had also suffered violent pain before the cataract was formed. The crystalline was of a yellow white colour, and very opaque; the ball of the eye was very hard; the cornea projected towards a point; and

* The pupil is not always dilated in cases of the gutta serena. It is sometimes, on the contrary, considerably contracted, even when both eyes are affected; and when patients are in a state of total blindness, from this cause alone, without any complication with other disorders. This is an observation which the Translator, as well as the Author, has repeatedly made; and it contradicts the opinion of many authors, particularly of Porterfield, who, in his *Treatise on the Eye*, page 183, vol. i. asserts, that the pupil in the gutta serena is always dilated, unless this disorder be complicated with some other.

many

many varicous vessels were spread over the sclerotica. This complication of symptoms discouraged the performance of any operation. However, by the importunities of the lady, joined with those of her relations, and also of the physician who attended her, my father was prevailed upon, and, in some measure, constrained, to perform it ; yet still assuring them that it was not likely to be attended with success. The cornea was scarcely divided, and the crystalline extracted, when the varicous vessels in the interior part of the eye began to bleed. The hæmorrhage continued ten hours, at the end of which time it stopped of itself, without producing any bad consequences. The patient was put to bed as soon as possible after the operation. She suffered violent pain for six hours, after which it gradually abated. Nothing remarkable occurred during the consequent treatment. When the eyelids were opened, the pupil was found to have its natural colour, to be quite immoveable, and much dilated ; but, as my father had foretold, the lady was still

unable to distinguish any object. The wound in the cornea was perfectly closed.

The appearance of the eye, after the operation, was less deformed than before, in consequence of the pupil having recovered its natural colour. The ball was not now so hard, nor was the sclerotica covered with so many varicous vessels. The pain also, to which the lady had been very subject, previous to the operation, returned afterwards much less frequently. This was a slight relief, but even this cannot always be obtained. In such cases, therefore, medical men ought never to recommend any operation.

S E C T. XIX.

Upon the Section of the Cornea upwards.

IN all those cases where the lower or external lateral part of the cornea is opaque,—where the circumference of this tunic is small, and a large section of it necessary,—and where the crystalline resembles an hydatid,—the incision through the cornea should be made from below upwards, in order that the wound may be in its upper and internal lateral part, next the great angle of the eyelids. This incision must be made in a direction contrary to that which I have above recommended in common cases of the cataract; and which, as may have been observed, is in its lower and external lateral part, next to the small angle of the eyelids. In order to make the incision in this manner, the cutting edge of the knife

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must

must be turned upwards, and carried on in this direction, with the same precautions as if it were intended to make the incision downwards, and with the same care to defend the iris from being wounded. (See fig. 7. and 8.) The incision is made in this way with as much facility as in the former; and by employing it in particular cases, much advantage may often be derived. When a cicatrix, or opacity, exists in the lower or external lateral side of the cornea, no new cicatrix will be added in this part by the operation, and a cicatrix in the upper and inner side of the cornea will neither interfere with the pupil, nor afford any obstacle to the sight. In those cases again where the cornea is small, I have remarked that the crystalline is constantly large, and in them it is necessary to make the incision large, in order that the crystalline may come through it easily. Now if the incision be here made outwards and downwards, the stretch upon the iris will be so great, when the crystalline comes through the pupil, that the iris will unavoidably be engaged

gaged in the section of the cornea, and a staphyloma be produced; the reduction of which afterwards is often difficult. But if the incision be made upwards and inwards, the upper lid will entirely cover the wound, and it will be found to heal without any accident. The following cases are added to prove the utility of this practice.

CASE XXV.

M. Sandré had a cataract in the right eye, the extraction of which was attended with many difficulties. The crystalline was very large, and the cornea very small. The cornea had a natural opacity round its circumference, which left but little room to make the section, and this opacity was much more considerable in its inferior and outer part than in its superior. The patient, however, consented to the operation, as the only means by which he could possibly recover his sight; and it was accordingly performed in the year 1782, in presence of

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M. de

M. de la Planche, a physician in Paris, who was both a colleague of mine, and a relation of M. Sandré. The incisions of the cornea and of the capsule were both made at the same time, and upwards, in the manner I have above directed. The vitreous humour repeatedly presented itself before the opening, but was retained by this situation of the section. The crystalline, though very large, came out easily, and the operation was as successful as could be wished. No staphyloma followed, and the incision in the cornea readily healed. If the incision in this case had been made, as it usually is, in the inferior and outer part of the cornea, it would have been likely to produce this accident, and if it had been made horizontally, this could not have been avoided.

C A S E XXVI.

In the year 1765, my father was sent for to London to attend his Grace the Duke of Bedford, who had a cataract in each eye. He performed the operation in the presence
of

of M. Gataker, a gentleman whom I have already had occasion to mention. The same difficulties presented themselves in this, as in the preceding case. The cornea in both eyes was very small, and in their inferior part there were opacities occasioned by previous inflammations. The crystallines appeared to be larger than usual, which rendered it necessary to obtain apertures in the cornea proportionably large. These were made, in the manner I have just directed, in the superior and internal lateral part of the cornea, in order to avoid both an increase of opacity in this tunic, and also a staphyloma. The incisions were completed in both corneas without attempting, till afterwards, to puncture the capsules. The extreme sensibility of the patient rendered this caution necessary, who, at the instant the knife was performing its office on the left eye, suddenly drew back his head, and almost threw down my father's assistant. By this accident the Duke was exposed to the greatest hazard of receiving an injury, and his escape from it was solely owing to my father's care, who followed him in his motions,

motions, and happily terminated the incision upwards with perfect safety. During the progress of the instrument, in making the incision of the right cornea, there was reason to be apprehensive that a similar accident would have happened; and, in fact, it did take place, but with less violence than in the first instance. Both capsules were next punctured with the needle; after which, the crystallines were extracted, without the loss of any part of the vitreous humour; a circumstance which might easily have occurred, in consequence both of the fluidity of this humour, and the unsteadiness of the patient. It was indeed prevented partly by the sudden closure of the eyelids, but especially by the position of the incision through the cornea. Notwithstanding this was large, no staphyloma ensued; and, in the space of a fortnight, his Grace was cured, without one untoward accident; upon which he again appeared at Court.

The crystalline humour is sometimes reduced almost wholly to the state of a purulent fluid, in the centre of which a very
small

small nucleus only remains solid. In such cases the capsule becomes disengaged from its adhesion to the neighbouring parts, and, with the crystalline contained in it, very nearly resembles an hydatid tumour. This species of the cataract is not difficult to be discovered. The pupil is entirely filled by it, being very often immoveable, and the crystalline appears to be very white. A small projection of the iris may also be observed, which is pushed forward by the hydatid behind it; and in consequence of this, the space of the anterior chamber is diminished. When an operation is performed on account of such a cataract, even the slightest pressure on the eye must carefully be avoided; it being necessary to restrain rather than to encourage the extraction of the crystalline; and the upper lid must be dropped the instant the incision of the cornea is finished. This incision should be performed, as in the two preceding cases, inwards and upwards; since, if it be made, on the contrary, in the usual method, downwards and outwards, the crystalline will escape with too much rapidity, and the membrane of the vitreous humour
being

being at the same time almost wholly destroyed, a large portion of this humour will escape with it. Whenever such an accident happens, though the sight may not be entirely lost, it will at least be much injured.

C A S E XXVII.

The celebrated Euler, who died in the year 1784, was attacked with a cataract at Berlin. The crystalline humour suppurated, its centre alone remaining solid; and this floated in the opaque fluid contained in its capsule; so that the whole taken together resembled a small bladder *. According to the

* The structure of many parts of the human body may be so considerably altered by disease, that we shall often err, if we attempt to judge what they ought to be, from their appearance when thus affected. The crystalline humour, inclosed in its capsule, under the form of an hydatid, in which state I have often seen it, is a proof of this assertion. It exhibits the appearance of a small smooth ball, and seems to have no attachment or continuity with any other part. From hence we might be

the account I received from the surgeons who had examined the eye, the pupil was
immoveable.

be led to conclude, that the capsules of the crystalline are particular membranes, distinct from the hyaloid tunic, and not prolongations of it. This has been the opinion of some anatomical writers, and particularly of Cusson. (See his Remarks on the Cataract, p. 12, 15.) But when we consider, further, that such a state of the crystalline is merely the effect of disease; and that when it occurs, the hyaloid membrane of the vitreous humour is at the same time always destroyed, we shall see cause to doubt the validity of this conclusion, and to admit the evidence of a contrary doctrine, which results from the dissection of a sound eye. It is indeed difficult to conceive how the hyaloid membrane, which, in its natural state, not only envelopes the crystalline humour, but retains it in its place, should become so completely detached from the vitreous humour, round the circumference of the lens, as afterwards to remain solely adherent to the crystalline, and to assume the appearance of a distinct well formed tunic. Nevertheless such a change not unfrequently takes place; and it is no less certain that this change is occasioned by some malady. It appears to me to be produced by the projection of the anterior part of the crystalline; by the action of which on the hyaloid membrane, this membrane is gradually drawn forwards, and detached from its adherence to the vitreous humour; and this humour, being thus deprived of the anterior part of its tunic, is left free and floating in the eye; in consequence of which, when the operation is performed for the hydatid cataract, the vitreous
humour

immoveable. Under these circumstances, the cataract was extracted by an oculist, who suffered the greatest part of the vitreous humour to escape with it; insomuch that M. Euler did not afterwards recover his sight. He had, at that time, an incipient cataract in the other eye; and soon afterwards totally lost the sight of it, on a journey from Berlin to Peterburgh, in which place he proposed to reside. My father, who was sent for to Peterburgh, in the year 1771, by M. le Comte Rasoumouffsky, Hettman des Cosaques *, was consulted by M. Euler. Having examined the eye, he recommended the operation, which advice this learned man eagerly adopted. The section was made in the

humour almost always and unavoidably escapes. Such an accident, however, is best prevented by making the section of the cornea upwards and inwards, in the manner I have recommended above.

* M. le Comte Rasoumouffsky had in each eye a sort of unguis, which has never yet been accurately described by any author. These excrescences were accompanied with very large varicous vessels, and required a long and difficult operation. I shall give a particular detail of this disorder in another place.

upper

upper part of the cornea. The crystalline, which was soft, and in the form of an hydatid, like that of the other eye, came through slowly, as my father wished it, and he found no occasion to puncture the capsule. The vitreous humour had no opportunity given it to escape, and no accident of any kind either attended the operation, or resulted from it. The pupil became a little more moveable than it was before *, and the patient recovered his sight. The success of this operation is recorded in the *Commentarii Medicinæ de Leypsick* †.

* Although it is most commonly observable, that the pupil has less power to contract and dilate after the operation than it had before, yet it sometimes happens that this power is sensibly increased. Such cases, indeed, are very unusual, and they seem to be owing to the following circumstance:—The iris having been compressed, either by the enlargement of the crystalline, or by its adhesion to some part of this membrane, becomes free when this humour is extracted, and either recovers its natural state, or at least approaches nearer to it than it was before.

† Vol. xvii. part 3, artic. *Nova Physico Medica*, p. 540. Petropoli die 28 Septem. Clar. Leonardo Eulero, “visus amissus felici operatione cataractæ à celeb. lib. Bar. à Wenzel, restitutus est.”

CASE XXVIII.

In the year 1781, I was consulted by Mademoiselle de la Verdine, who then lived in Paris. She had submitted to have one cataract extracted by an oculist in that city, but without the smallest success; and the failure I imputed to the escape of almost the whole of the vitreous humour, together with the crystalline. This judgment I formed from the inspection of the eye, which was now much smaller than the other, and from the appearance of the pupil, which was clear, black, and moveable. On examining the other eye, the convexity of the iris, together with the shape and colour of the cataract, led me to suspect that the crystalline was dissolved, and in the form of an hydatid. It had the true vesicular appearance I have above described. This determined me to make the incision upward, and immediately the crystalline inclosed in its capsule came through the aperture, as completely and as favourably as I could have wished. The vitreous

humour

humour, which presented itself before the incision, was retained by speedily dropping the upper lid. I directed the patient to place her head in a low position, and to lie as still as possible, without using any motion that was not unavoidable. She remained three days, perfectly tranquil, in the same position. I then removed the dressings, and found the cicatrix well formed. No accident happened, and, at the end of a fortnight, the lady made use of her eye. The pupil became more free, and the iris had its natural appearance; except only that it acquired a vibrating or trembling motion in the aqueous humour *, which still remained perfectly limpid.

* This circumstance of a trembling motion in the iris, to which oculists do not seem to have paid sufficient attention, takes place, not uncommonly, after both the extraction and depression of the cataract. It is difficult to describe, although very easy to perceive it. It is a sort of undulation, which seems to be occasioned by the aqueous humour, though this humour undergoes no real change. The cause of it, which is distinct from that of the contraction and dilatation of the pupil, may in a great measure be attributed to the absence of the crystalline; in consequence of which, the iris loses a great part of its support.

O

S E C T.

S E C T. XX.

On the Opacity of the Fore Part of the Capsule, the small Portions of the Crystalline that sometimes remain after this Humour is extracted, and the Effusion of the Vitreous Humour during the Operation.

C A S E XXIX.

THE wife of a shoemaker, named Françoise, consulted me in June, 1785, having lost the use of her left eye for many years. This was occasioned by a very white cataract, the extent as well as the colour of which inclined me to believe, that the crystalline was soft; and the truth of my opinion was confirmed by the event. The motion of this pupil was not so free as that of the right eye, which
was

was undiseased; and both eyes were small, and situated deep in the orbits. The woman had a great dread of the operation: she however committed herself to my care, and consented to have it performed. I first made a simple section of the cornea, without attempting to wound the capsule with the cornea knife. This I afterwards opened by means of the needle. I then proceeded to extract the crystalline, which, as I expected, was very soft; but, contrary to what is usual in such cases, it adhered to the iris, and came through the cornea with difficulty, even after its adhesions were destroyed. During its extraction a part of the vitreous humour projected through the pupil, and a small portion of it escaped; but by quickly shutting the lids, its further effusion was prevented. I was obliged, however, to open the lids again, after a few moments had elapsed, to satisfy myself that no part of the crystalline remained behind; which precaution was not without its use; since I now found that an opaque substance still remained; which, filling the aperture

of the pupil, formed as complete an obstruction as that which had been occasioned by the entire crystalline, before it was extracted. This substance I removed; but in so doing I was unable to prevent the escape of another portion of the vitreous humour. The pupil afterwards appearing clear and black, I applied a compress on the eye, and retained it with the usual bandage. I directed the patient to be kept very still, prescribed a proper regimen, and, being encouraged by the success I had met with in many similar operations, under which a much greater quantity of the vitreous humour had been discharged, I gave her hopes of recovering the sight of this eye. The compress and bandage were not removed till after the expiration of four days, nor was the eye touched during this time, lest another portion of the vitreous humour should escape. She suffered no pain after the operation, which indeed is most commonly prevented by the discharge of the vitreous humour. But when I uncovered the eye, and opened the lids, she could

could scarcely perceive any object before her. I examined the pupil with great attention, and still discovered in it an opaque body, which almost entirely occupied the space of this aperture. It proved to be a portion of the crystalline, similar to that I had extracted after the removal of the lens. This, I suppose, while the eye was bound up, detached itself from the border of the capsule, to which it previously adhered, and by which adhesion it was kept out of my sight during the operation. The wound in the cornea was now united, and the eye being very irritable, I thought it best to leave the case for the present, and to wait till the eye should be in a proper state to undergo a second operation. After some months the woman came to me again, the wound in the cornea being now perfectly re-united. But the pupil was still obstructed by the same opaque body I had before seen, and the rays of light entered the eye through only a very small aperture. By means of this she saw a little, but not sufficiently to enable her to go a-

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bout,

bout, and to take care of herself. Being determined to try every thing that afforded a hope of having the sight of this eye restored, she readily agreed to my proposal of repeating the operation. I was convinced that if I made the incision in the inferior part of the cornea, a portion of the vitreous humour would unavoidably escape, during the extraction of the opaque substance in the pupil; and therefore I determined to make this incision in its superior part. In effecting this I was in some degree embarrassed by the iris, which, on the escape of the aqueous humour, came forward, and enveloped the blade of my knife. However, I terminated the section happily, after having disengaged this membrane by gentle frictions on the fore part of the cornea, in the way already recommended. I then attempted to remove the opaque portion of the crystalline that remained in the eye, and obstructed the admission of the light; but on introducing the curette, I found a resistance to the instrument, and discovered that this resistance

was

was produced by the anterior part of the capsule, which being in part opaque, and, at the same time, adherent to the pupil, kept back the remaining portion of the crystalline. Though this capsule had been divided by the needle in the former operation, the wound was now re-united, and the whole of it was become as hard as the shell of an egg. I removed it almost in one piece, by means of a small forceps, contrived for such purposes, and afterwards I extracted the opaque portions of the crystalline that remained in the eye. As the vitreous humour was prevented from escaping during this part of the operation, by the situation of the section in the cornea, I employed, according to my usual custom in operations for the cataract, a gentle friction on the fore part of the cornea, both with the back of the curette, and also with the end of my thumb; and being at length satisfied that all the opaque matter was removed, because, if any part of it had remained be-

hind, the friction would have brought it forward to view, I bound up the eye,

Though the operation was long and fatiguing, yet the patient suffered very little pain from it; and the incision of the cornea closed up in a few days, without either an inflammation or staphyloma. I used no particular remedies that deserve to be mentioned. The pupil remained clear and black, though much larger than it naturally is, and slightly deformed. This was undoubtedly occasioned by the efforts that were necessarily made to separate the adhesion between the capsule and the iris. In the event, the sight became as good as it could have been after the most successful operation.

S E C T.

S E C T. XXI.

*On the Cataract that has its Seat
in the Humor Morgagni.*

THOUGH the separate existence of the humor morgagni is not admitted by a celebrated author *, who asserts, that when a humour is found within the capsule, it is produced solely by a dissolution of the crystalline, yet these humours appear to be totally distinct from each other; since the former is observed to undergo various changes, while there is no sensible alteration in the structure of the latter. The following cases, and many others that have fallen under my observation, fully convince me of the truth of this opinion.

* Percival Pott, Remarques sur la Cataracte, p. 499. in 8°, traduit de l'Anglois.

C A S E

C A S E X X X .

In the year 1765, a young man put himself under the care of my father, in London, who had a cataract in the right eye, the colour of which was extremely white. It was remarkable in this case, that as soon as the cornea and the anterior portion of the capsule were opened, and before the section was completely finished, a milky substance issued out of the pupil, and escaped, with the aqueous humour, through the aperture in the cornea, leaving the pupil as clear as that of an eye from which the opaque crystalline had been completely extracted. It was at first supposed, that this opaque substance was the crystalline itself, in a state of suppuration. The patient recovered his sight, and distinctly perceived many small objects that were placed before him. A convex glass, suitable for a person who had had the crystalline removed, was placed before

fore the eye of the patient, in order to try the effect it would produce; but all objects seen through it at the usual distance, were as indistinct and confused as they commonly appear to a person whose eyes are sound, and who looks at them through a similar medium. This circumstance surprized my father very much. However, the eye was bound up, and the patient was put to bed. The next day, on removing the dressings, a foreign body was observed between the edges of the eyelids, which was immediately known to be the crystalline, in its natural state of transparency. The substance, therefore, which was removed on the preceding day, must have been the opaque humor morgagni, since the crystalline was found to be in its natural state, not only in point of transparency, but likewise of size. The young man, when the cure was completed, saw like other persons who have had the cataract extracted, and required the use of a similar convex glass.

C A S E

C A S E XXXI.

I made a journey with my father to Vienna, in the year 1774, and there I had an opportunity of observing several cases similar to the preceding, in some operations performed by myself, and still more in the great number of those which were performed by him. One remarkable instance occurred in the case of a young child, who had a cataract in the left eye. The crystalline had a bright white colour, and entirely filled the pupil. The cornea and the anterior portion of the capsule were scarcely divided, when a milky matter escaped with the aqueous humour, and the child perfectly distinguished objects in an instant. This inclined us to believe that the crystalline had been completely dissolved. But the next day, on removing the dressings, I found the crystalline lodged in the incision of the cornea, the lips of which were kept separate by it. It came away with the dressings, transparent,

transparent, colourless *, and rather small, being probably reduced in size in consequence of the softest part adhering to the linen. Nothing remarkable occurred in the sequel of this case, and the child obtained a perfect cure.

Since that time it has fallen in my way to perform the operation upon two poor men, one of Compiegne, and the other of Dammartin, each of whom presented the same phænomena. But by a slight pressure on the eye, after the opaque humor mor-

* The crystalline humour in children is very transparent; but as persons advance in life it assumes a slight yellow colour. There are authors who pretend to have discovered vessels proceeding from the central artery of the retina to be inserted into the body of the crystalline. But, inclosed as this body is in a capsule, with which it is furnished from the hyaloid membrane, and immersed in the fluid contained in this capsule, it does not appear to me to have any communication with other parts of the eye. It is difficult to comprehend how the crystalline can preserve its transparency, when the fluid in which it floats is diseased. I shall not attempt to solve this difficulty; but shall content myself with observing, that there is a multitude of similar facts in the practice of physic, of which it is perhaps impossible to assign the cause, but which, notwithstanding, do undoubtedly exist.

gagni

gagni was brought out, the crystallines appeared and were also extracted *.

It

* It cannot be denied that in each of the preceding cases, as related by the author, two different substances were found within the capsule of the crystalline humour, one of which was opaque and the other transparent. But it does not follow from hence that these substances were originally different from one another, or intended, when undiseased, to produce different effects on vision. It is well known that the crystalline is of a much firmer consistence at the centre than about the circumference, where, for a certain space, it is not unfrequently found to be in a fluid state. This, which is the original constitution of the part, appears to be so contrived in order to produce a due refraction of the rays of light as they pass through the crystalline, in their way to the retina. Now it is not impossible that particular circumstances may occasionally arise, which render one of these parts opaque, but produce no effect at all on the other. The Translator, for instance, is acquainted with a gentleman, in each of whose eyes the centre of the crystalline is perfectly opaque, while its circumference is as perfectly transparent. The opacity, however, though large enough to cover half the pupil when the eye is exposed to a moderate light, is not so large as to cover the whole of it in the brightest light. The sight of the gentleman is therefore as good as if there was no opacity in the crystalline whatsoever. This instance, like those which are here related by Baron de Wenzel, occurs very rarely. The Translator is therefore of opinion that they are insufficient to establish the opinion, that there are

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two

It ought to be remembered that in parallel instances, the crystalline should always be extracted without hesitation; for if this be neglected, it will afterwards lose its transparency, or it may come forward, and lodge in the anterior chamber of the aqueous humour; in either of which cases it would render a second operation necessary.

two distinct substances within the capsule of the crystalline, in opposition to the numerous observations which have been made on the contrary side both by anatomists and oculists.

S E C T.

S E C T. XXII.

On the Separation of a Part of the Iris from the Choroides; a Circumstance which sometimes takes Place in the Operation for the Cataract.

AMONG the inconveniences to which the iris is liable, during the process of this operation, I shall take notice of its separation from the choroides in any part of its circumference. Although this accident very rarely occurs, yet, as it may happen, it becomes a matter of considerable moment for surgeons to be aware of it.

C A S E XXXII.

In the year 1776, my father was sent for to Haerlem, to perform the operation of extraction upon Madame Patin, wife to a burgo-

burgomaster of that city, who had a cataract in each eye. Neither of them presented symptoms that could excite an apprehension of danger or difficulty in the operation. Nevertheless the cornea and the capsule were scarcely opened, when the iris detached itself, in its inferior and outward lateral portion, to the extent of about a fourth part of its circumference. This accident, without doubt, was occasioned by the impulse of the humours of the eye forward; the lady's eyes being naturally prominent, and likewise very irritable. The crystalline afterwards found an easier passage through this incidental opening, than through the pupil; and a considerable portion of the vitreous humour escaped with it, notwithstanding great care was taken to drop the upper lid as speedily as possible.

It was very extraordinary that the other eye should likewise exhibit precisely the same phenomenon. For, during the operation upon this eye, the iris was detached, in the lower part of its circumference,

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from

from its connexion with the choroides; and here, also, the crySTALLINE came through the new opening. Happily, however, this accident did not, in the smallest degree, prevent the success of the operation in either eye. The patient experienced neither pain nor inflammation. Indeed, as we have already observed, when a part of the vitreous humour is lost, it rarely happens that much inconvenience arises from either of these causes. And its further effusion was prevented by placing her in bed, on her back, with her head low. The dressings were not removed for several days; and when the lids were opened the lady distinguished every object perfectly. Upon examining the eyes, we were, however, very much surprised to find that both the pupils were closed, and that the light was admitted only through the aperture made by the separation at the bottom of the iris. This new pupil was exactly similar in shape to that of a cat; but it was nearly horizontal, and opposite to the inferior part of the cornea.

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The entire closure of the natural pupil appeared to us a very extraordinary circumstance, because the lady had felt no pain; whereas it is well known that such an accident rarely happens, but in consequence of severe suffering. This artificial pupil, however, proved to be as serviceable to the lady, as the real and natural pupil could have been; for after three months had elapsed, she was able, with the aid of proper glasses, to read the smallest characters.

In case, therefore, of a like accident, we are not to despair of a cure; nor are we to persist in attempting to force the crystalline through the pupil, if it shews a greater tendency to pass through the new opening; and, especially as the pressure that would be requisite for this purpose might cause a large proportion of the vitreous humour to issue through this channel.

C A S E XXXIII.

In a journey which I took with my father to Groningen, in the year 1776, I saw a case nearly similar to the preceding, which proved still more fortunate in the event; I mean with regard to the artificial pupil.

A poor man consulted my father on account of a cataract in each eye, which had deprived him of sight upwards of two years. We examined his eyes attentively, and, from the appearance of them, had reason to conclude, that the extraction of the cataracts might be easily and successfully accomplished. His eyes were very prominent, and irritable; the pupils dilated and contracted with great freedom; and when the hand was moved before them, the patient perfectly distinguished it. In short, the case was eminently attended with the most promising and desirable symptoms. The cornea in each eye was divided, without attempting

tempting to open the capsules, on account of the great agitation of the patient. These were afterwards punctured with the gold needle. The crystalline of the left eye passed without difficulty, although the disease in this eye had been of the longest duration. On my father's applying the customary pressure on the right eye, the iris became detached in its lowest part from its connection with the choroides; and the crystalline, instead of advancing through the pupil, escaped from its capsule, and moved towards this new opening in the iris. My father facilitated its extraction by means of the curette; and the accidental opening in the iris was rendered much wider by the passage of the crystalline lens, which was very large, through it. A small portion only of the vitreous humour escaped. The crystalline was firm, and came out entire, leaving no fragments behind it; and, indeed, if any such fragments had remained in the eye, they would soon have escaped

with the vitreous humour. The usual compress and bandage were applied; and, in order to avoid a fresh discharge of the vitreous humour, the precautions that are common in such cases were recommended; such as keeping the head low, lying on the back, and preserving the most perfect tranquillity. The dressings were not removed for several days, that a competent time might be allowed for the perfect reunion of the wound in the cornea. The pain which the patient endured was by no means exquisite; that of the left eye affected him most; and, at the end of ten days, a much longer time than is requisite in simple cases, I opened the lids, when he perfectly distinguished every object. The pupil of the left eye was round, and the cicatrix perfectly consolidated; that of the right eye was a little oblong, which shape it had acquired in consequence of a part of the iris being included in the cicatrix; but as the cicatrix was very near the sclerotica, it did not at all intercept the sight;

sight; and after some months, and with the assistance of proper glasses, the patient could read the smallest characters.

In consequence of the iris being included in the cicatrix, and united with it, the aperture made by the separation of its inferior fibres became invisible. This proved advantageous to the patient, since it not only prevented a slight deformity, but, if the natural and artificial pupils had both continued, the sight would probably have been confused by them. It is also probable, that if this separation of the inferior fibres of the iris had not happened, a staphyloma would have been formed; since, notwithstanding the distance which necessarily took place between the iris and the wound in the cornea, in consequence of this accident, the iris became entangled in the wound, whilst the eyelids were kept shut.

The two preceding cases, which are such as rarely occur, if I may be allowed to judge from the few examples of this kind which I have found amongst the nu-

merous authors that have come within my knowledge, seem to favour the opinion of those anatomists who consider the iris as a membrane distinct from the choroides, and not a continuation of it. Riolan is perhaps one of the first who was of this opinion *; and it was afterwards adopted by many others. Duverney † supposed the iris to be distinct from the choroides, and so did Zinn ‡. On the contrary, Winslow §, Senac ||, Le Cat ¶, Porterfield **, and Haller ††, have supposed that the former was a continuation of the latter. Guerin ‡‡ foresaw the possibility of a separation of the fibres of the iris,

* Antropolog. lib. 14. cap. 4.

† Lieutaud par M. Portal, 1777, vol. ii. p. 51.

‡ Descript. Anatom. Ocul. in 4°. Gottingen, 1755, p. 101. Hoin, Mercure de France, Aout, 1769, p. 154.

§ Expos. Anatom. in 4°. Paris, 1732, p. 662.

|| Anatom. d'Heister, in 8°. Paris, 1735, p. 692.

¶ Traité des Sens, Paris, 1742, in 8°. tom. i. p. 374.

** Treatise on the Eye, vol. i. in 8°. Edinburgh, 1759, p. 152.

†† Physiol. tom. v. in 4°. Laufane, 1769, p. 369.

‡‡ Malad. des Yeux, in 12°. Lyon, 1769, p. 219.

when

when the crystalline was obstructed in passing through the pupil; but he has produced no one instance of this accident. Janin *, likewise, has barely taken notice of it. This separation sometimes takes place upwards, and sometimes on the side next the inner angle of the lids; but in whatever part it occurs, the crystalline always comes through the artificial opening.

* *Malad. des Yeux*, p. 417, in 8°.

S E C T. XXIII.

On the Re-union of the Fibres of the Iris, after their Division by the Knife, during the Section of the Cornea.

IT has repeatedly been proved, that the fibres of the iris, after being divided, are capable of re-uniting; and the complete union which sometimes takes place between the sides of the pupil, after blows on the eye, as likewise after the hypopion, or severe inflammations, and occasionally, even after the operation for the cataract, seems to corroborate the truth of this assertion. The possibility of such a re-union between the sides of a wound in the iris, has induced me to recommend the removal of a portion of this membrane, in the operation of making an artificial pupil*.

* See the 27th Section.

By

By this precaution, the re-union of the sides of the new aperture (an accident which often occurred when the operation was performed in the manner recommended by Chefelden) will be avoided. The following case fully proves that a wound in the iris, if made according to the direction of its straight fibres, may again be united.

C A S E XXXIV.

Mrs. S. had lost the sight of her left eye for two years, without any preceding pain or inflammation. This lady consulted me in the year 1785, and on examining the eye, I immediately perceived, from the colour of the pupil, that she had a cataract, which was soft and milky; the whole extent of the pupil, as is usual in such cases, being fully occupied by it. I proposed an operation, to which she immediately consented. The extreme agitation of her spirits, at the time
of

of the operation, determined me, first of all, to make a simple division of the cornea, and not to attempt, till afterwards, to puncture the capsule. The event justified my precaution. For, when the point of the instrument, which I directed towards the inferior and internal lateral part of the cornea, had passed the pupil, the lady, whose agitation increased, suddenly turned her eye towards the knife. This violent motion it was out of my power to prevent; and, notwithstanding all my care and dispatch, the inferior part of the iris was wounded by the point of the instrument. After having disengaged it, I had still the utmost difficulty to complete the section of the cornea; since all the arguments and intreaties I could use to compose the patient were ineffectual; and she suddenly threw her head backward with so much force, that she nearly threw down the person who supported the upper eyelid. I found it no less difficult to puncture the anterior portion of the capsule with the gold needle, nor was it, till I
had

had made repeated efforts to this purpose, that it was accomplished. At length, after having perfectly extracted the cataract, as well as the opaque particles, which, as is sometimes the case, remained behind, I examined the state of the eye. The pupil was contracted, but retained its natural shape, and its appearance was black and very clear. That part of the iris which the instrument had wounded, was situated about the distance of one line (one twelfth part of an inch) from the inferior border of the pupil. It was of an oval shape, nearly a line and a half in length, and half a line in breadth; and the separation in the fibres of the iris was nearly in a perpendicular direction. The sight was not injured by this accident, since, immediately after the operation, the lady perfectly distinguished every object presented to her. Having often observed, under similar circumstances, that wounds in the iris would again unite, I did not despair of effecting a complete cure in the present instance. I pursued the usual treatment,

and

and it proved successful. The pain she suffered was moderate, the inflammation was very inconsiderable, and no staphyloma ensued. After some days, I opened the eye, and found the pupil clear. The wound in the iris, likewise, was greatly diminished. When a few days more had elapsed, it was scarcely perceptible; and, in the space of a fortnight, it was impossible to distinguish that the iris had ever been injured. She was soon able to read with the help of proper glasses, and at this time retains a good sight, though upwards of fourscore years of age. The operation was more tedious than it usually is, not only on account of the patient's restlessness, but also by reason of the small aperture between the eyelids, the depth of the eye in its socket, and some adhesions which the cataract had formed, and which it was necessary to separate.

S E C T.

S E C T. XXIV.

On the Treatment of Patients after the Operation.

WHATEVER mode of performing the operation may be adopted, and whatever precautions may be used, we must not flatter ourselves that pain and inflammation can always be prevented. I can, however, truly assert, that inflammation and excessive pain occur much less frequently when the operation is conducted in the manner I have recommended, than when it is performed in any other way. In fact, an operation which is usually finished in half a minute, and which seldom requires the use of more than one instrument, or two at most, is likely to be attended with fewer inconveniences than one which takes up much more time, and a greater variety of means. It must
prove

prove detrimental to multiply instruments unnecessarily; and those who do so forget a precept which has been laid down by the greatest masters in the art of surgery, *to make all operations as simple as possible.*

When the operation is completed, it is necessary to guard against wetting the eye, by the application of any liquid whatsoever, not even with a mixture of brandy and water *, which it has been customary to

* I have occasionally used, not only brandy and water, as above mentioned, but many other applications; and after much attention to the effects which they produce, I believe them all to be more injurious than useful.

The experience of the Translator has however produced in his mind a very different opinion from that of the Author, as expressed in the preceding note. He has found, that a dossil of lint steeped in plain water, or brandy and water, and covered with a spermaceti, or saturnine cerate, and removed once every day, is the most easy and convenient dressing that can be applied after the operation. The cerate over the lint prevents the latter, when impregnated with the discharge, from becoming stiff, and irritating the lids.

The Translator takes this opportunity to remark, that the mode of applying the compress and bandage over the eye, after the operation, is a circumstance of no small

to use on this occasion. The eye should simply be covered with a dossil of lint; over which a dry compress should be applied, which is to be tied on with a bandage. The dressings should, in general, be

small importance, and deserves a greater degree of attention than either the Baron, or his father, seems disposed to bestow upon them. If the bandage, for instance, fits too loose round the head, the dressings are very apt to slip off, and in consequence of it, to press unequally and injuriously on the eye; and if too tight, the undue pressure will excite pain and inflammation, and may perhaps express a part of the vitreous humour. The compress the Translator employs is made of soft linen, folded two or three times, wide enough to cover both eyes, and sufficiently long to extend from the upper part of the forehead to the lower part of the nose. This he pins, at the top, to the patient's night-cap; and its lower part, which is divided in the middle, to allow the nose to come through it, he lays loosely over the eyes. The bandage, which is also made of old linen, and equal in breadth to that of six fingers, he carries round the head over the compress, and pins to the side of the night-cap moderately tight. This he pins on the side of the night-cap rather than on its back part, in order that the dressings may be removed, when necessary, without lifting the patient's head from off the pillow. He afterwards carries a slip of linen under the chin, and pins it, at each end, to the side of the bandage, to prevent it from slipping upwards.

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removed

removed every day, to dry up the tears, and to wipe away the matter which usually collects in the great angle of the eye, and about the lids. Particular circumstances, however, may sometimes render it necessary to leave the same dressings on for several days, as I have already observed in a preceding section.

If both eyes have been operated upon, it is proper that the patient should lie on his back; if one eye only, he should lie on the opposite side. By observing this method, a deformity in the figure of the pupil will often be avoided, the discharge of the aqueous humour will not be continued so long a time as it otherwise would be, and that of the vitreous humour will be prevented. The pain, inflammation, and swelling of the eyelids will also be obviated; accidents which are not unfrequently produced by a tight pressure on the ball of the eye.

On the first and second day, the patient should take only weak broths, together with diluting and cooling drinks, such as

barley water, veal tea, chicken broth, whey, and the white emulsion; or else, acidulated liquors, such as lemonade, or orange juice and water. After the third day, if there has been no pain in the eye, the use of light meats, and a stronger broth, with herbs in it, may be allowed. But if an inflammation or pain in the eye should come on, during any part of the confinement, the patient should be immediately bled in the foot; and this operation should be repeated once or oftener, as circumstances may require. In this case also, he should be put upon a severer regimen, and the use of antiphlogistic remedies should be longer continued.

I must not omit to mention, that the lower eyelid should be drawn a little downwards, each time of changing the dressings; since the edge of it is not unfrequently turned inwards, and, insinuating itself between the lips of the wound, keeps it open, and has sometimes occasioned very considerable mischief. This acci-

dent, however, is less considerable, and less frequent, when the incision of the cornea is made obliquely, according to our mode of performing it, than when it is made horizontally. Yet the precaution I have mentioned is always proper, and, if attended to, may often prevent a staphyloma.

The watering of the eyes, which takes place very commonly when the dressings are left off, and the eyes are exposed to the light, ought not to give any alarm. This sometimes lasts ten or twelve days, and then gradually decreases. I know of no remedy that has any efficacy either in restraining or lessening this inconvenience. It gradually ceases of itself, in proportion as the eyes gain strength, and become accustomed to the action of the light, and of the air.

The œdematous swelling of the lids, which also often takes place after the operation, and continues nearly as long as the watering of the eyes, is of little consequence, and should occasion no

disquiet or uneasiness. It naturally subsides of itself, without any application, whenever the eye is exposed to the air. Tonic and various other applications that have been recurred to in like cases, are at least useless, and sometimes have retarded the cure. It is better to trust to nature alone for the removal of this inconvenience. And the surest way to dissipate the swelling, and to shorten the duration of it, is, as soon as it is perceived, to leave the eye uncovered. This swelling prevents the lids from opening freely, and consequently the rays of light cannot readily be admitted into the eye; which, however, at any rate, could not materially affect the sight.

The swelling of the lids is sometimes so considerable, that it cannot but excite some apprehensions with regard to the success of the operation. Yet we may rest assured of a favourable issue, if the patient suffers no pain, and if he perceives the light through his eyelids. From considerations of this nature, I was satisfied in

my own mind that the operation described in the following case would prove successful.

Le Sieur Merry, a Swiss porter at one of the gates of the Tuilleries, underwent the operation of having a cataract extracted, which, at the time it was performed, was attended with the usual success. But three weeks afterwards, he was unable to separate the eyelids; and they were then so much swelled, and so great a quantity of tears and matter was collected in the eye, that when it was opened for the space of a second or two, the patient was not able to distinguish any object whatever. Notwithstanding this discouraging circumstance, he perceived the light through the eyelids; and as no unfavourable accident had happened during the treatment, except that he had a troublesome cough, I did not abandon the hope, that his case would terminate happily. In fact, the swelling of the lids gradually decreased, without the use of any remedies; and when the patient was able to open his eye without assistance,

assistance, he saw all objects pretty distinctly. In proportion as the flowing of the tears and the swelling of the lids abated, his sight very sensibly improved.

There are instances in which a slight depravity of sight takes place after the operation; as when objects appear double, which is sometimes the case; or, as at other times, they are seen under a shape somewhat different from that which they really exhibit. Bodies, for example, that are round, appear to patients of this description, of a long or elliptical form. But this incorrect vision goes off by degrees, and commonly in a month or six weeks after the operation, no imperfection remains.

But the most formidable accident that follows the operation of extracting the cataract, is a violent inflammation of the globe of the eye; during the continuance of which, the conjunctiva becomes considerably inflated, and the eye immersed in a large quantity of acrid matter. In consequence of this, the cornea not unfre-

quently becomes opaque, and purulent matter is collected behind it; the matter being sometimes found in both chambers of the aqueous humour; and from this cause, the patient suffers excessive and incessant pain. If the remedies that are usually directed in cases of inflammation, both those which are more general, as well as those which are particularly adapted to such cases, be insufficient to produce an absorption of the matter, which indeed too often happens, the case is hopeless; and the pain will not cease until the suppuration is complete, and the eye sunk and lost. I am not aware of any assignable cause for this melancholy accident, unless it be owing to a vitiated state of the humours in the patient's general habit, or to some local defect in the original structure of the eye. But, be this as it may, I am happy to subjoin, that it very seldom occurs in the course of our practice.

Again, a collection of purulent matter is sometimes formed in the eye within a few days after the operation, without any external

external symptoms of inflammation, and without being preceded by any remarkable sensations of pain. This abscess of the eye presents two diseases, which the ancients distinguished by two different names; viz. Hypopion, when the collection of matter was lodged in the anterior chamber; and Empyema, when in the posterior. Whenever it is suspected that such a deposit is made, the existence of it may be ascertained by gently opening the eyelids after the second or third day. The cornea, in this case, will appear dim, the iris of a greenish hue, and the aqueous humour thick and turbid. A large blister should immediately be applied, either to the nape of the neck, or behind each ear; and recourse should be had to bleeding, evacuating, and other such general remedies as are calculated to promote the absorption of the matter. The affected eye should be left free, without either compress or bandage; topical applications being never of any use, and often tending

ing to increase the violence of the disorder.

The bare mention of a curious resource, which was adopted by an oculist called Justus, a cotemporary of Galen, who wisely shook the head of the patient till the abscess burst, and the matter found an easy vent, is enough to excite ridicule *.

Nor does it require profound discernment to see the absurdity of the instrument contrived by Platner, in the form of a tube, in order to draw out by suction the pus contained in the chambers of the eye †.

Nor shall I dwell upon the extraordinary method which Woolhouse mentions as having been used with success, but which is, in fact, almost as ridiculous as that of Justus. See a dissertation by David Mauchart, preserved by Dr. Reufs, and published at Tubingen ‡.

* Scultet. Append. varior. Instr. p. 57.

† Platner, Prax. cap. 7. de Visus Læsione.

‡ P. 83, in 8°, Tubingæ, 1783. Dissertat. II.

The operation recommended by Galen*, which consists in again opening the cornea, ought not, I think, to be used in the present case; for the matter would not escape through this second opening without great difficulty. And, even in cases where the first wound remains open, it would be found almost impracticable to give vent to the matter; and if accomplished, a new quantity would quickly be generated. I have often attempted, to draw out the matter in such cases, by means of a curette; but my attempt has been always without success. I have found the matter so thick and glutinous, that the instrument passed through it, without detaching any part of it. And when it has been necessary to make a second incision through the cornea, the cicatrix has always been formed with great difficulty. Meeckrenius recommended the use of a needle in this operation†; and Tourberville, an English oculist, employed a tro-

* Lib. 14. de Method. Medendi, circa finem.

† Heister. Instit. Chir. tom. I. p. 598. fig. X. tab. 18.

car*. But in cases similar to that which I am now describing, all these methods have appeared to me to increase the pain, and to afford no manner of assistance.

The true Hypopion, on the contrary, which follows a violent inflammation of the eye, is often happily relieved by a section of the cornea. And in this last mentioned disease, the incision should be made with the same knife which is employed in the operation for the cataract. But I shall describe this more particularly, in a dissertation I mean to publish upon the Hypopion.

* David Mauchart, *Dissertat. de Empyssi Oculi*, Tubing. 1742.

SECT.

S E C T. XXV.

*Upon the Staphyloma that follows
the Operation for the Cataract.*

WHEN the eyelids are first opened, which is usually done about nine or ten days after the operation *, a portion of the iris is sometimes observed to protrude

* I am fully persuaded that the eyes may be opened much sooner than I have here mentioned, without any danger; and indeed, that it is often useful to do so. See Case XII. I have sometimes observed, that the cicatrix has been formed in less than forty-eight hours. And, in those cases, where it is not formed in this space of time, it will not be more completely formed in a fortnight; since the cause that prevents the union, which is a staphyloma, either of the iris, or of the capsule of the aqueous humour, takes place as certainly when the eye is shut, as when it is open. But though I think that the cicatrix is often well formed in the time that I have allowed for this purpose, I am not of opinion that the eye should be then exposed to a strong light. The bandage should be left off; but a shade should be substituted in its place, and only a moderate share of light be admitted into the room.

itself

itself through the wound, forming a sort of hernia; and, sometimes, instead of the iris, a portion of the capsule of the aqueous humour is thus protruded; which capsule is known by its transparent and bluish colour. This last circumstance I have so often observed, that I cannot forbear to express my surprise, that anatomists who have treated of the structure of the eye, should have so long over-looked it, as it proves undeniably the existence of this particular membrane. The pupil, in this case, preserves both its figure and its size; and when the projection is pierced, a small quantity of the aqueous humour always escapes.

The sensibility of the capsule of the aqueous humour is sometimes so great, that the patient has very little ease so long as a hernia of it continues. The following is a case of this kind: A lady who had gone through the operation of having a cataract extracted (which operation had been tedious and painful) consulted me on account of a tumour on the transparent cornea,

cornea, which was situated nearly opposite to the pupil. On examining the eye I discovered, that the obstacles which the oculist, who was a Parisian, had met with, were occasioned wholly by the smallness of the incision which he had made through the cornea; which incision he had finished in a line even with the lower edge of the pupil. The violence which the coats of the eye suffered in consequence of this, while the crystalline was forced through the pupil, occasioned exquisite pain, and was succeeded by a severe inflammation. But the lady notwithstanding, recovered her sight. So true is it, that there are persons whose cure cannot be prevented, although they be tormented in every possible way. The vigour of the constitution, the strength and soundness of the eye, and the watchful and incessant care of nature for the preservation of the human race, will often support individuals under the effects of the most improper remedies, and carry them through operations that are the most unskilfully

skilfully executed. A staphyloma of the capsule of the aqueous humour, however, remained, which the oculist had tried, but in vain, to reduce. He had cut it off several times, but it always appeared again the next morning. The basis of the tumour was so tightly compressed by the sides of the wound in the cornea, that it gave the lady very great pain. She had, indeed, enjoyed but little rest night or day, for the seven or eight months that had elapsed since the operation. And though the pupil was clear, black, and round, she could make no use of her eye, on account of its continual watering.

Such a protrusion, either of the iris or of the capsule, of the aqueous humour, through the incision in the cornea, is an accident much less likely to happen after our mode of operating than after any other. However, as it may happen at any rate, and under the best management, it is my duty to take some notice of it, and to point out the means by which it may be remedied.

Hippocrates

Hippocrates and Celsus speak very obscurely of the staphyloma. But all the ancient physicians who mention this disorder, propose remedies for it, which possess a greater or less degree of activity. Galen advised an application of the juice of cantharides *. Paulus Ægineta, and Gui de Chaliac, recommended the lapis calaminaris †; Fabricius ab Aquapendente, the unripe fruit of the thymælea, or spurge flax ‡; and Plempius, Armenian bole mixed with allum §. There are not wanting authors who even advise the use of the strongest caustics, such as the lapis infernalis ||, and butter of antimony ¶; and Richter assures us, that he has employed them with success **. But these appli-

* De Compos. Medic. lib. iv. cap. 8.

† Lib. iii. cap. 22.

‡ Chirur. in fol. Venetiis, 1719, p. 25.

§ Ophthalm. lib. v. cap. 22. Lovanii, 1659.

|| St. Ives, Maladies de l'Œil.

David Mauchart, Dissertat. de Staphylomate, Tübing. 1748.

¶ Janin, Maladies des Yeux, p. 394.

** Observat. Chirur. fascicul. secund. Gotting. 1776, p. 122.

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cations being attended with some risk, surgeons should not adopt them without the utmost caution.

Woolhouse employed a peculiar method of reducing the hernia of the iris, which he called *emboitement*. He used an instrument made of lead, gold, silver, or some other metal, and constructed in the shape of the eye. This apparatus, properly oiled both on its convex and concave side in order to prevent an irritation of the eye, he introduced under the eye-lids, in such a manner that it might press the tumour on the cornea*. An instrument similar to this, under the name of *moule de platre*, has been used by some practitioners, even after the operation for the cataract. But such instruments must prove highly injurious in every species of the staphyloma; and more especially when it follows the operation of extracting the cataract; in some instances of which kind, I have

* David Mauchart, *Dissertat, de Staphylomate*.
Tubing. 1748.

known it to occasion a suppuration of the whole eye.

The method which is at present most commonly employed for the purpose of reducing this species of the staphyloma, consists in the application of graduated compresses *. But even these have been found very inconvenient, and I am persuaded the reduction of the hernia may more readily be accomplished without them †.

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* See *Les Remarques sur Dionis*, par la Faye, en 8vo. Paris, 1773, p. 547.

Platner, *Instit. Chir.* tab. 6. fig. 13. en 8vo. 1783. This author has described an instrument proper for the purpose above mentioned.

† The pressure that has been recommended by some practitioners, as a cure for the staphyloma, and which is here objected to by the Baron, is certainly ill calculated to answer the purpose for which it is designed. In consequence of the unavoidable motion of the eye, it is impossible to retain a compress on the projecting part of the cornea so steadily as to prevent it from occasionally slipping off; and when this happens, pressure must rather tend to aggravate than to cure the disease. The only remedy the Translator has found essentially useful in such cases is, as he before mentioned, the causticum

The mode, therefore, which we adopt in our practice, is to leave the eye perfectly free. And then the motion of the lids will be found to reduce the projection much more speedily, as well as more frequently, than graduated compresses can possibly do; and without the inconveniences which usually attend these applications. I have seen many instances of persons who have had cataracts extracted from both eyes at different periods of time, in whom a consequent staphyloma has been cured much sooner, and with less inconvenience in the eye which has been left at liberty, than in that which has been covered with a compress; and this, even when the disease has prevailed to a greater degree in the former case than in the latter.

When a staphyloma has continued a great length of time, antient authors advise to carry a needle through its base,

lunare; the application of which, two or three times in the course of a week, has evidently and repeatedly produced the best effects; and, he is clearly of opinion, has often much accelerated the removal of the tumour.

threaded

threaded with a double thread; to tie one of these threads on the right, and the other on the left side of the tumour; and to leave the parts thus embraced in the ligature, until they fall off of themselves. This operation has been recommended by Celsus*, Paulus Æginetus†, Aëtius‡, and others; and it was performed nearly in the same manner by all of them. They particularly recommended the operation, when the projection was the effect of ulcers and inflammations in the eye; but in this kind of staphyloma, as well as in that which comes on in consequence of the operation for the cataract, I think it best to leave the reduction of it to the simple efforts of nature. The motion of the eyelids will occasion the wound to close first of all in the two points where the knife entered and came out of the cornea. Thus a gradual pressure will be made on the tumour, which will make it retire by

* Cap. de Staphylom.

† Encheirid. lib. 6. cap. 19.

‡ Tetrabibl. 2. serm. 3. cap. 35. p. 343.

degrees. In a little time, a new and neighbouring part of the wound will be closed, which will cause another portion of the iris to retreat; and the cure will go on in the same manner, until the whole tumour be completely reduced. In fact, I have seen very few staphylomas that have taken place in consequence of the operation, which did not soon disperse, and in this manner, by the meer action of the eyelids, where the eye has been left free and uncovered; as, on the contrary, I have seen the reduction of such tumours very much retarded by the various bandages and applications which have been contrived by different surgeons to expedite the cure.

This method succeeds equally well, whether the staphyloma be produced by the iris, or by the capsule of the aqueous humour. In the latter case, however, when the tumour has been of long continuance, I do not hesitate to cut off the projecting bag which is formed externally. This is attended with no inconvenience

venience, and accelerates the cure. It must be observed further, that the capsule of the aqueous humour so readily unites and extends itself after being cut off, that sometimes, even the very day after it has been removed, and the aqueous humour it contained has been discharged, a second staphyloma of a similar kind has been formed in the same place, which must likewise be removed by a similar operation. And this membrane unites and cicatrizes so much more speedily than the cornea, that I have occasionally been obliged to repeat the operation three times in quick succession. It should be remembered, however, that I only recommend it in those cases where the staphyloma is produced by the capsule of the aqueous humour*, and is of long standing.

In

* Notwithstanding the confidence with which the Author in this section, and in other parts of his treatise, speaks of the Capsule of the Aqueous Humour, the Translator, having been disappointed in his endeavours to discover it, on dissecting the eyes of a very considerable number of animals of different sizes and species, cannot

In regard to those cases, where the projection is formed by the iris, I leave them to nature, whose operations are always salubrious, and fully competent to the cure of this disease.

reconcile himself to the idea of giving to the transparent tumour, which sometimes projects through a wound in the cornea, the appellation of a staphyloma of this capsule. The fact, however, that such a transparent tumour does sometimes project through a wound in the cornea, he does not attempt to dispute; and, in these cases, he is disposed to believe, either that a union takes place between the sides of the wound in the inner lamina of the cornea, previous to the union in its external lamina, in consequence of which the former projects through the latter, and produces the tumour here described; or else, as he before observed, that the substance secreted through the sides of the divided cornea, to form the connecting medium, becomes inspissated, and is gradually stretched and pressed out by the aqueous humour behind it.

SECT.

S E C T. XXVI.

Upon the various Kinds of Secondary Cataracts.

IT has generally been supposed, that the secondary cataract is situated in the capsule of the crystalline humour. Common, however, as this opinion is, it is not always a just one. For it sometimes happens, that the crystalline, after the principal part of it has been extracted, and especially if it be soft, leaves some portions still behind, which, in consequence of their viscosity, retain their situation, as it were, entrenched within the capsule, and constitute the secondary cataract, of which we are now treating. These fragments cannot always be perceived at the time of the operation; and the patient, immediately after it is finished, may see very well, and the aperture of the pupil appear

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quite

quite clear. The opacity is preceded by so little pain or inflammation, that many days may intervene before it be discovered; and it seems probable, that the opaque particles were prevented from escaping at the time of the operation, by some adhesions they had contracted with that part of the capsule which lay behind the iris. Now this species of the secondary cataract ought not to be confounded with the opacity of the capsule itself; which last is almost always preceded by violent pain and inflammation, and is in general a partial opacity, appearing in some parts of the pupil much whiter than it does in others. Whereas, on the contrary, if the opacity be produced by a portion of the crystalline left behind in the eye, and now as it were dissolved, and reduced into a kind of thick mucilage, the patient will suffer no pain, the colour of the cataract will be uniform, though less white than before the operation, and it will occupy the whole, or nearly the whole extent of the pupil. In cases of the latter kind, if the
incision

incision made in the first operation be closed, it will be necessary to open the cornea a second time, in order to extract the whole of this opaque substance, by means of the curette: for there is no reason to expect that the remnants of the crystalline will dissolve, notwithstanding this has been asserted by many authors, and in particular by Pott*, and Richter † ‡.

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* Œuvre Chirurgie, Article de la Cataracte, p. 509.

† Observations sur le Cataracte, Gotting. 1770, p. 53.

‡ The experience the Translator has had in cases similar to this described by the Baron, and which he calls a lymphatic cataract, has produced in the Translator's mind an opinion very different from that which is here advanced by the Baron. The Translator remembers two cases, in which he operated himself, and in both of which, after the operation, the pupils appeared perfectly clear, and the patients saw distinctly every object presented to them. Notwithstanding this, at the end of a fortnight, when the eyes were opened for the first time, the pupils were observed to be again covered with an opaque matter, which completely destroyed the power of vision. In one of these cases, the opaque matter was wholly absorbed in the course of a week, and the sight was again restored. In the other, it

This species of the secondary cataract *
seems to be produced by a lymphatic mat-
ter

it remained three months; at the end of which time, the opacity, without any known cause to produce it, began to be dispelled, and in less than a week, the pupil became perfectly transparent, and the sight as good as it ever is after the most successful operation.

The Translator begs leave to express his sentiments here on another part of the operation, on which the Baron, in the present section, and in many other parts of his treatise, particularly insists. He means a scrupulous care to remove every small opaque fragment that remains in the eye, after the extraction of the cataract. If these fragments can be removed without difficulty, as they generally may, it is unquestionably proper always to accomplish it; but if, from the untractableness of the patient, or the spasmodic action of the muscles of the eye, there be danger of a part of the vitreous humour being forced out during the attempt, he thinks it much safer to leave these minute fragments in the eye, and to trust to the absorbent power of the lymphatic system to get rid of them, than to hazard the ill consequences which the discharge of the vitreous humour is too apt to produce.

* The species of cataract mentioned by Dr. Reuß, in a dissertation written by David Mauchart, which was revised by the Doctor and published at Tubingen, in the year 1783, and which he, page 56, calls a membranous and phlegmatic cataract, is very different from that which is here the subject of consideration. It was occasioned

ter thickened. I have extracted many such cataracts, and have afterwards found, when they were pressed between the fingers, that they readily dissolved. I believe them to be formed, as before observed, by exfoliations from the external lamen of the crystalline, and more especially from its circumference; which parts becoming soft, may be considered as in a state of dissolution. Now, when the operation of extraction is performed on a crystalline thus altered in its structure, these soft parts will not always come away with it, but sometimes remain attached to the sides of the fossula in the vitreous humour, and, though unseen at the time of the operation, afterwards move forwards before the pupil, and again intercept the rays of light. Experience has convinced me that these opaque portions separate from the crystalline during the operation of extraction

caused by a part of the crystalline itself, broken off by the needle either in an attempt to depress it, or in some other way of operating, and which afterwards escaped into the anterior chamber, and there remained.

much

much oftener than is commonly supposed. I have also found, that by gently rubbing the cornea, after the body of the crystalline is come through, that many such portions may be made to appear in the pupil, which, otherwise would remain unnoticed. I therefore never neglect to rub the cornea in this manner; and if, after repeating it several times, and extracting all such portions, the pupil becomes clear, and no more opacities arise, I then think I have reason to conclude that the crystalline has been wholly extracted, and that there is no ground to be further apprehensive of a *lymphatic cataract*; by which name I shall distinguish this kind of opacity from the *capsular cataract*. There are, however, some cases in which a lymphatic secondary cataract comes on, notwithstanding the pupil remains clear, after the frictions I have here recommended. This undoubtedly depends upon the viscosity of the remaining portions of the crystalline, and upon their strong adhesion to the sides of the capsule, most probably, in that particular

ticular point where the anterior and posterior portions meet each other. I shall now state two cases of this description; premising, however, that such instances occur less frequently than those in which the light frictions above recommended bring forwards the opaque fragments of the crystalline.

CASE XXXV.

In the year 1780, I operated on a woman, who, after the cataract was extracted, distinctly saw every object that was placed before her. I repeatedly rubbed the fore part of the cornea with the end of the curette, and removed all the opaque particles that then appeared; after which the pupil became perfectly clear. But notwithstanding this care, I found, on opening the lids, after a few days had elapsed, that she was unable to distinguish any object, though the eye had suffered neither from pain nor inflammation. On examining the
eye,

eye, I perceived that the pupil was again entirely filled with an opaque whitish substance; and I was instantly aware, from the indications above described, that this opacity was not produced by an affection of the crystalline capsule. I waited three months after the first operation, before I proceeded to perform a second; in order that the wound in the cornea might be perfectly healed, and that I might be assured that this opaque substance would not dissipate of itself. As soon as the cornea was divided a second time, the opaque matter presented itself before the incision, and I facilitated its extraction by means of the curette. The pupil immediately became as clear as after the first operation. I gently rubbed the cornea with the back of the curette; but as nothing more appeared, and the patient distinguished even the smallest objects perfectly well, I closed the eye, and applied the usual bandage. The following day I again opened the eye for an instant, in order to see whether any new opaque matter obscured the pupil, and

and with a view, if there had been any, to remove it at once. But I found the pupil very clear ; and if any of the opaque matter was left after the second operation, it most probably escaped with the aqueous humour, which almost always flows, and sometimes in considerable abundance, for four-and-twenty hours after the operation. In short, the cure was finally accomplished without any accident.

In this instance, the cicatrix of the first incision in the cornea was invisible. I therefore made the second incision in the usual manner, and in the same direction with the former. If, on the contrary, the cicatrix had been considerable, I should have made the second incision upwards ; but even the second incision was, in the present case, so thoroughly healed, that, in a short time, this also was scarcely perceptible.

C A S E XXXVI.

In the year 1783, a lady consulted me on account of a cataract in the right eye, and was desirous to have it extracted. The appearance of the eye seemed to indicate the propriety of the operation, and to afford a prospect of its being successful. The crystalline was very white, and covered the whole extent of the pupil. This aperture possessed its native power of moving with the utmost freedom; and she distinguished the day from the night, and the shadow of my hand when I moved it before her.—In the left eye also, there was an opaque substance, which exactly filled the pupil; but this substance was not so white as the crystalline of the other eye, and, upon examining it attentively, it appeared to be situated deeper in the eye than the cataract is usually found. I likewise perceived a cicatrix in this cornea, and from hence immediately inferred, that the lady had already gone through an operation,

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ration, and that the opacity in the pupil was occasioned by some portions of the crystalline, which had at that time been left behind. The grey colour of the opacity confirmed me in this opinion, as likewise the smallness of the wound in the cornea. The lady then acknowledged, that she had undergone an operation on this eye two years before, when the mere process of extracting the cataract alone had lasted more than twelve minutes. I could readily give credit to this information; for an incision so small as that which I here observed was scarcely sufficient to allow the half of a common sized crystalline to pass through it, and would necessarily prevent its opaque fragments from escaping with the aqueous humour, as they would have done if the incision had been larger. The lady assured me that the crystalline was really taken out, and that, immediately after the operation, she distinguished objects perfectly; which fully convinced me, that the loss of sight in this eye could have been occasioned only by a lym-

phatic secondary cataract. I therefore encouraged her to hope that the sight of this eye, as well as of the other, might be restored, if she could make up her mind to submit to another operation. She determined upon it; and I began with the right eye. I made the incision through the cornea very large, and, having extracted the crystalline, took great care to remove all the mucous particles that accompanied it. The pupil now appeared black and clear. Being warned, however, by the failure of the preceding operation, I gently rubbed the fore part of the cornea with my thumb, at the same time gently raising and lowering the upper lid; upon which an opaque substance again appeared, which almost filled the whole extent of the pupil, and entirely obstructed the sight. I extracted this mucilaginous substance, and the pupil appeared clear a second time. I then repeated the friction on the cornea with my thumb and the curette, a third time; and, a third time, brought forwards an opaque substance,

nearly similar to the former, which I also extracted. After this, though I renewed the frictions, I was unable to produce the appearance of any fresh matter; I therefore became satisfied that all the opaque particles were now removed; and this conclusion was established by the event, as the sight of the eye was perfectly restored. I afterwards made an incision, as large as in the former instance, through the cornea of the left eye, and removed with the curette the opaque matter that occasioned the privation of sight. I repeatedly rubbed the cornea, that if any opaque portions remained concealed behind the iris, I might bring them forwards to view; but as I discovered nothing of this kind, I applied the proper dressings, and bound the eye up in the usual manner. The next day I gently opened the eyelids, and finding both the pupils perfectly clear, I thought myself warranted in giving the lady hopes of a speedy and perfect cure; which, in fact, happily took place, and, by the help of proper glasses,

she was afterwards able to read with both eyes.

From this case may be clearly inferred the necessity of rubbing the cornea, in order to discover if any portions of the opaque crystalline be left in the eye, after the extraction of the cataract. Such fragments, if suffered to remain, might destroy the sight a second time, or might, at least, render it necessary to have recourse to a second operation, to which patients, in general, submit much more reluctantly than they do to the first. From hence, also, appears the necessity of making a large incision in the cornea; because in this case, the opaque fragments of the crystalline that may be left behind will sometimes escape, together with the aqueous humour; and in the instance I have just related, if the incision in the cornea of the left eye had been made sufficiently large, it is not improbable that the opaque fragments would in this manner have been discharged.

The cases that have been already stated,
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as well as many others that might be added, if it were necessary, are directly repugnant to the opinion which is maintained by those who favour the practice of depression, in regard to the dissolution and absorption, both of the depressed crystalline, and of the milky or viscid matter which often accompanies it*.

One of the most unfortunate of those accidents which occasionally happen in consequence of the operation of extracting the cataract, is an opacity of the posterior part of the capsule of the crystalline. This sometimes comes on without great pain; but more frequently, it is preceded by exquisite suffering. I have observed, that this secondary cataract takes place most commonly after the operation has been performed upon children; and in general, it is not perceived until the wound in the cornea is closed. In this case, the cornea must be opened a second time, and the opaque capsule removed with a small

* See the note in page 36.

forceps, (see fig. XI. in the annexed plate). The utmost caution must be used not to touch the membrane of the vitreous humour with the joints of this instrument, nor to lay hold of it at the same time with the capsule *. And as the capsule comes through the cornea, the upper lid must gradually and carefully be dropped over the eye, in order, as much as possible, to prevent the effusion of the vitreous humour; which, however, it is, in many instances, extremely difficult to avoid.

I scarcely need add, that when at any time the posterior part of the capsule of the crystalline is perceived to be opaque during the operation of extracting the cataract, it must by no means be suffered to remain, but must instantly

* The posterior part of the capsule of the crystalline lies in such close contact with the membrane that covers the vitreous humour, that the Translator believes it to be utterly impossible to engage and extract the former, without at the same time involving the latter.

and

and without hesitation be removed, whilst the wound in the cornea continues open, in the manner explained in this section.

SECT.

S E C T. XXVII.

Upon the Closure of the natural Pupil, and the Mode of making an artificial one.

IT sometimes happens, in consequence of the operation for the cataract, that after the patient has suffered pains, more or less severe, the edges of the iris, which float in the aqueous humour, unite, and thus create a new obstacle to vision. This closure of the pupil, which is occasioned by the inflammation of the iris, and by the suppuration in which it terminates, has always been considered as the most grievous accident that can possibly take place, after the operation of extraction; and the unhappy patient who has the sad experience of it is generally doomed to the total and perpetual loss of sight. This malady, which the Greeks called

called *Synezesis Pupillæ*, may also be owing to a defect in the original structure of the eye, which, no doubt, was the case of the blind person whom Cheselden restored to sight *. Such a native or constitutional

* Le Cat, *Traité de Sens*, Paris, 1784, in 8°. p. 482.

Morand, dans l'Eloge de Cheselden, *Histoire de l'Académie de Chirurgie*, Paris, 1778, tom 3. p. 115.

David Mauchart, *Dissert. de Pupill. Phthis. ac Syniz.* Tubing. 1745, p. 100, curâ et studio Reufs, &c.

"It appears that Cheselden, in order to make an artificial pupil, in the case of a young man, the inner edges of whose iris were closed, punctured the sclerotica, at the distance of about half a line posterior to its union with the cornea, with a needle a little longer, and less spear-pointed than that which is used in couching. He passed it through a part of the posterior chamber of the aqueous humour, and when it came nearly opposite to the center of the iris, he turned its point toward this membrane, and divided it crossways. The fibres, wounded by the needle, retracted, and an oblong pupil was formed transversely, more open in the middle than towards the extremities of it, and shaped like the pupil of a cat, though in a contrary position.

"Some learned men have entertained doubts whether the operation was really performed in the manner it is here described, since it is difficult to conceive how an instrument can be introduced so exactly into the posterior

tutional disorder of the eye ought not, however, to be confounded with that closure of the pupil which is produced by the membrane which Wachendorf * describes,

“rior chamber of the aqueous humour, as to divide the
“iris, without tearing the membrane of the vitreous hu-
“mour, and entangling the crystalline so as unavoid-
“ably to depress it.”

For this reason it has been supposed that Cheselden only performed the common operation for the cataract (*a*). The celebrated Haller (*b*) was of this opinion. And Warner, one of the surgeons to Guy's hospital, in London, says, that he never saw the operation for making an artificial pupil, after the manner recommended by Cheselden, performed with success (*c*) (*d*).

* Commerci. Litter. Norimb. ann. 1740. Hebdom. 18 tom. 1. f. 7. 1744.

Haller, Act. Upsal. ann. 1742.

Zinn, Anatom. Ocul. Human. p. 94, 1755. f. IV.

(*a*) Voltaire, Elemens de Philos. de Newton, vol. 14, in 4to. 1771, p. 190.

M. de Buffon, Histoire Naturelle, in 12mo. tom. 4. p. 16, 1752.

Smith, Traité d'Optique, p. 94, liv. i. chap. 5. ann. 1767.

(*b*) Physiologie, tom. v. p. 519, Lauzanne, 1769, en 4to.

(*c*) Description of the Human Eye, and its adjacent parts, together with their principal diseases. London, 1775, p. 84, in 8vo.

(*d*) The Translator sees no good reason to dispute the veracity of Mr. Cheselden in his description of the present case. It was certainly possible for him to succeed in the way he has here mentioned. At the same time, the Translator is of opinion, that the operation proposed by the Baron, which he thinks would naturally occur to every person who prefers the operation of extraction to that of depression, is much more likely to be attended with success.

and .

and which commonly disappears in the fœtus at the age of seven months, although it sometimes continues to exist even after the birth *.

Many authors besides Cheselden have advised, in cases of a total closure of the pupil, whether it existed from the birth, or whether it succeeded the operation for the cataract, to make an incision in the iris, either directly through its middle, or else in the shape of a cross †. But though the simple incision did succeed in the case of the blind person mentioned by Cheselden, subsequent and repeated operations have proved that the fibres of the iris will close again, after they have been thus divided. My father has had many instances to con-

* Haller, *Physiol.* tom. 5. p. 373, Lauzanne, 1769, in 4°.

M. Sabatier, *Traité d'Anatomie*, tom. i. p. 534. ann. 1775.

† Gendron, *Maladies des Yeux*, Paris, 1770, in 12°. tom. 2. p. 196.

Guerin, *Maladies des Yeux*, in 12°. Paris, 1769, p. 253.

Janin, *Maladies des Yeux*, p. 191.

vince him of this fact; and it is in consequence of these, that, in our practice, we employ a different mode of operating. This new method has constantly succeeded with us, and as there is reason to believe it may prove equally successful in the hands of others who apply themselves to this branch of surgery, I shall now proceed to describe it with all the accuracy of which I am capable.

The patient is to be placed in the same position, as if he were to undergo the operation of having the cataract extracted; and the cornea knife, described in a former part of this treatise, is to be pierced into the cornea, exactly in the same manner as in that operation. When the point of the instrument has arrived at about the distance of half a line from the center of the iris, it must be plunged into this membrane, to about the depth of half a line; and, by a slight motion of the hand backward, it must be brought out again, about the distance of three quarters of a line from the part in which it entered.

ed *. Then, pursuing the incision, as it is before described, in common cases of the cataract, the section of the iris will be completed before that of the cornea, and will present a small flap nearly a line in diameter. This section of the iris, like that of the cornea, will be in the form of a semi-circle †. A small scissars is then
to

* The size of the opening to be made in the iris, as here recommended by the Baron, appears to the Translator to be much too small. Instead of two thirds of a line (or the sixteenth part of an inch) he is of opinion, that it ought to be at least the eighth part of an inch in diameter, which dimension is not greater than that which a healthy pupil usually has in a moderate light. And when the aperture is made thus large, it will be much more easy to extract the crystalline, in case it be diseased, or likely to become so, than when it is smaller.

† The portion of the iris which is divided in this operation is never so accurately shaped, as that of the cornea, nor does it exactly correspond with the representation given of it in the plate annexed (see fig. 14). But as it was necessary to communicate my ideas upon the subject, with as much precision and correctness as possible, I thought it my duty to describe the best shape in which it was possible to make the incision through it. I might have made a similar remark when I described the incision, which the cornea knife makes
through

to be introduced under the flap of the cornea, and the divided portion of the iris is to be cut clean off. By this method an artificial pupil will be made, which, in consequence of the sudden and equal contraction of the divided fibres, sometimes proves to be almost round*: and, after this operation, we may rest assured that

through the capsule of the crystalline. This incision is never so well shaped as that of the cornea; nor indeed is it necessary to be so; since, when the cataract is uncomplicated with other disorders, a wound in the capsule, though small, is necessarily and easily enlarged by the crystalline, in passing through it. I have sometimes seen the muscles of the eye so violently convulsed, that the crystalline, of itself, has burst the fore part of the capsule, before it was opened by any instrument, and has suddenly come through the incision in the cornea.

* In a treatise on diseases of the eyes, published at Montpellier, in the year 1783, by M. Pelier de Quinsgy, this oculist recommends, for the purpose above mentioned of making an artificial pupil, to divide the iris with a bistoury in a manner not unlike that which I have now described. But as he omits to recommend the removal of the flap in the iris, after it has been thus divided by the bistoury, which appears to me to be a very essential part of the operation, I am of opinion that his mode of operating must succeed in fewer instances than that which I have proposed.

the

the pupil, so formed, will never close again.

It may sometimes happen, in consequence of the retraction of the fibres of the iris, that it will be difficult to perceive and to cut off the divided flap of this membrane. With a little attention, and dexterity, a small portion of it, however, may almost always be engaged between the points of the scissars; and this portion, whatever it be, should be removed.

The operation I have here recommended differs essentially from that proposed by Cheselden, and must necessarily be much less painful; since the sclerotica, and the other membranes of the eye, which are wounded in the mode he recommends, and which was likewise adopted by Woolhouse, are infinitely more sensible than the transparent cornea, divided in our mode of operating. According to Cheselden's method of performing the operation, it appears to me impossible to avoid wounding the crystalline; which, in this case,

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is

is very liable to become opaque; an accident which would render a second operation indispensably necessary, in order to restore the sight. On the contrary, according to our plan, the crystalline may readily be extracted at the time when the new pupil is formed; and this, indeed, I always judge most adviseable, in order to avoid the inconveniences which an opacity of this humour, under such circumstances, would necessarily occasion.

C A S E XXXVII.

M. Buiffiere, a native of France, residing in Cork-street, London, consulted my father, in the year 1764, on account of a cataract in the right eye, which began to shew itself about a year before. Soon after the consultation, he was attacked with a most violent ophthalmia in this eye, which terminated in a total closure of the pupil. Being thus wholly deprived of sight, he determined, after the
cure

cure of the ophthalmy, to put himself under the care of my father, and submit to the operation ; who, however, apprized him that it would necessarily be more difficult and more complicated than the operation for the common cataract. The operation was performed in the presence of Mr. Middleton, who, during the war in Hanover, had been a celebrated surgeon in the English army. My father divided the iris at the same time with the cornea, according to the process which I have described above, and without its occasioning any hæmorrhage. The flap of the iris, which was about three quarters of a line in length, withdrawing itself both upwards and downwards, a portion of the opaque crystalline became visible. A pair of fine scissars was now introduced into the anterior chamber of the eye, through the opening in the cornea, and with this a part of the flap of the iris was removed at one stroke. In doing this, no more blood escaped than in making the first section. An artificial pupil was now formed, which

had nearly the same extent as the natural pupil. This aperture admitted the introduction of a needle, with which my father destroyed the anterior capsule of the crystalline, now become opaque, and perhaps slightly wounded by the cornea knife. The crystalline afterwards came through with great ease, and was much more opaque than it appeared to be before the ophthalmomy. The eye was dressed in the usual manner, and though the operation was very tedious, it is remarkable, that the patient afterwards suffered very little pain, and had no inflammation at all. The cicatrix of the cornea was quickly formed, and when the lids were separated, the sight was found to be as good as could reasonably be expected after such an operation. It did not seem to be in the least injured by the alteration in the shape and extent of the pupil, which was irregular and immoveable.

When the pupil closes, in consequence of a violent inflammation, like that I have described in the last case, it rarely happens
that

that the crystalline preserves its transparency : and if, by the greatest chance, this humour should still continue transparent, it is in great danger of being rendered opaque by the operation of making an artificial pupil. The natural space between the iris and the crystalline is usually so small, that it is almost impossible to carry the point of the knife through the iris, to make the necessary aperture in it, without, at the same time, wounding both the capsule of the crystalline, and also the crystalline itself. And, if this happens, as the crystalline will certainly now become opaque, if it was not so before, it would afterwards be necessary to repeat the operation, in order to extract this humour, if the opportunity of doing it was neglected at the time the artificial pupil was made. But it should be observed, that, when the closure of the pupil is occasioned by a violent ophthalmia, it rarely happens that the organization of the eye is not otherwise so much injured, as to destroy all hopes from any operation. This accident, how-

ever, more commonly occurs, in consequence of an unsuccessful operation for the cure of the cataract; and, in this latter case, there appears much better reason to expect relief from an artificial pupil.

Again, the pupil, though contracted, is not always closed throughout its whole extent. It more usually happens, that a small portion of it remains open. This derangement of the eye has been called by the antients, *Pythysis pupillæ*, or *Tabes pupillæ*. A patient so circumstanced may still see, if the capsule of the crystalline be not at the same time opaque. The contrary to this, however, is often the case; and this opacity, which constitutes the most common secondary cataract, when joined with a contracted pupil, as completely destroys vision as if the pupil were entirely closed. In such a complicated case, it would be fruitless to attempt to extract the opaque capsule, without at the same time removing a portion of the iris; for though the pupil might be dilated, by means of a proper instrument, so as to allow

allow this opaque membrane to be taken hold of, yet it would afterwards close up entirely. Besides, the strong adhesion, which the capsule usually forms, in such cases, both with the posterior part of the iris, and with the borders of the pupil, would prove an additional obstacle to such an operation; and, in removing the capsule, it would be almost impossible to avoid wounding the iris also. The operation I have above described is perfectly suited to this complicated disease, as is fully demonstrated in the following

C A S E.

Colonel Lullin, who resides at Geneva, and is uncle to Messrs. Lullin, bankers in Paris, came here many years ago to have the operation performed on account of a cataract in the right eye. This operation proved unsuccessful, notwithstanding all the care taken by the oculist who performed it. The colonel returned to Geneva, and there remained, until he was

afflicted with the same disorder in his left eye; which seldom fails to happen, sooner or later, when the opacity proceeds from an internal cause. In the year 1781, he made another journey to Paris, being determined to try the success of the operation on this eye also. He now put himself under the care of my father. The extraction of the cataract from the left eye was performed according to our usual process, and was attended with as much success as could be wished. M. Lullin again returned home, having recovered the use of this eye. However, soon after his arrival in his native country, and even whilst he was on his journey, he perceived his sight to decrease. The eye being examined by a surgeon in the country, a white substance was observed across the pupil, which could be no other than the capsule of the crystalline, now become opaque in different places. As the opacity did not continue to increase, and as the patient still enjoyed some degree of sight, although less perfectly than it was immediately after the operation,

operation, my father advised him to continue as he was, and not to hazard a second operation on the same eye. M. Lullin, however, being naturally anxious, if possible, to recover his sight more perfectly, and knowing that my father would not operate on him again in the state in which he then was, sent for an oculist from Berne, who, differing in opinion from my father, tried to depress the opaque membrane by means of a needle. But after repeated attempts, the operator was obliged to relinquish his design, the adhesion of the capsule to the iris being so strong, that he found it impossible to separate them.

The state of the patient was now much worse than before; the opacity of the capsule being increased, and the pupil so much contracted, that it would scarcely admit the head of a common-sized pin. In the year 1784, therefore, he came to Paris again, and with uncommon fortitude, requested to have a third operation performed. My father, unwilling to refuse him,

him, resolved to enlarge the pupil, and to remove, at the same time, a portion of the opaque capsule. For this purpose he introduced the common cornea knife, in the usual manner, into the cornea, and when its point was brought within the space of half a line of the small remaining aperture of the natural pupil, he plunged it into the iris about the depth of a line; and then directing it into this aperture, continued the incision in such a manner, that a portion of the iris, and also of the capsule adherent to it, was divided at the same time, and formed a small flap; which was afterwards removed with a pair of scissors, and without any loss of blood. It was unnecessary to carry the knife through on the inner side of the cornea, because a very small aperture in the iris was sufficient to constitute an artificial pupil; of which the remaining portion of the natural pupil formed a part. The pupil, thus artificially opened, admitted the rays of light to pass freely into the eye, and was prevented from closing again, by the absence of
of

of that portion of the iris which had been removed by the scissars. The patient now enjoys his sight; the pupil, though rather large and somewhat irregular, being still open, as there is every reason to conclude it will always continue to be. The treatment subsequent to the operation was simple; the pain endured moderate; and the cicatrix of the cornea quickly formed. The eye was very little inflamed, and no staphyloma ensued.

The operation of making an artificial pupil, an instance of which I have just described, is not commonly followed by such violent symptoms as might be apprehended. The dressings should be simple, and it is unnecessary to keep the eye so long covered as after the extraction of the cataract. The patients on whom I have seen this operation performed, as well as those on whom I have operated myself, were cured without difficulty, and the pain they suffered was by no means insupportable. It has not appeared to me that their sight was more imperfect than
that

that of persons who had undergone the operation for a simple cataract. This may perhaps seem to be incredible to some of my readers, who reflect on the complicated nature of the operation, and the delicacy of the parts concerned in it. But notwithstanding this, I can, with truth, repeat my assertion, that among the great number of operations performed by my father in different parts of Europe, whither I have accompanied him, I have frequently seen him perform this, of making an artificial pupil, with success. It has also succeeded in the few instances of this kind that have fallen under my own care. But after all, I must not forget to add, that the cases which render it necessary very rarely occur.

From what has now been stated, those persons who have unhappily experienced a closure of the pupil, either in consequence of violent inflammation, or of the operation for the cataract, may take comfort, and may indulge a hope of recovering their sight, in case they are willing
to

to submit to an operation. To encourage them with a prospect of such relief, and to assist oculists in the performance of the operation, are the motives which have induced me to publish an account of my father's practice, in this important part of his profession.

F I N I S.

THE
EXPLANATION
OF THE
FIGURES IN THE PLATES.

Fig. I. Represents the blade of our cornea knife, without its handle, and in a position to be held by the right hand.

II. The cornea knife, in a position to be held by the left hand, with its cutting part lowest. A. The back of the blade. B. Its edge. C. A mark on the handle to distinguish the back from the edge of the blade.

III. The cornea knife in a position to be held by the right hand. A. The back of the blade. B. Its edge. C. A mark on the handle to distinguish the back from the edge of the blade.

IV. The

IV. The cornea knife piercing the cornea obliquely, and introduced into the pupil, to puncture the anterior portion of the capsule of the crystalline humour. A. The edge of the knife. B. The point where the instrument pierces the cornea. C. The point where it enters the pupil.

V. The cornea knife passed through the cornea.

VI. The shape of the incision in the cornea.

VII. The cornea knife employed in making the incision through the cornea upwards. A. Its back. B. the point where the instrument enters the cornea. C. The point where it comes out of it.

VIII. The appearance of the incision when made obliquely upwards.

IX. The

- IX. The gold needle and the curette fixed on the same handle. A. The gold needle. B. The curette.
- X. A small steel hook.
- XI. A pair of forceps, to extract the capsule of the crystalline humour, when opaque.
- XII. The speculum of Rumpelt, as described by Brambilla.
- XIII. The mode of making an artificial pupil. B. The shape of the incision in the iris; which, however, is never so well formed as it is here represented. A. The point where the cornea knife enters the cornea. C. The point where the knife comes out of the cornea. D. The edge of the knife.
- XIV. The appearance of the eye after a section has been made through the iris to form an artificial pupil. A. The flap
§ in

in the iris, which, however, is never so well formed as it is here represented. B. The shape of the incision through the cornea.

N. B. The knives in the above figures are represented in a position too perpendicular. They ought to have been drawn a little more obliquely, in the direction of the lines which mark its progress in those eyes which are represented alone.

XV. Represents the cornea knife which the Translator has been in the habit of using, passed through the cornea. The two edges of the blade of this instrument form a much less acute angle than those of the knives above represented by the Baron. In consequence of this alteration, when the Translator's

U . knife

knife has pierced through the cornea, its lower or cutting edge will sooner pass below the inferior margin of the pupil, than that of the knife used by the Baron. The former is, therefore, on this account, less likely to be entangled with the iris than the latter, when the aqueous humour is discharged. Notwithstanding this alteration, the back and edge of the Translator's knife form an angle sufficiently acute to allow the instrument to pass through the cornea with perfect ease.

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F I N I S.

ERRATA.

Page 2, line 18, for chryftalline *read* crystalline.

38, l. 10, for oated *read* floated.

115, l. 1, for employs *read* employ.

152, l. 19, for nearly *read* near.